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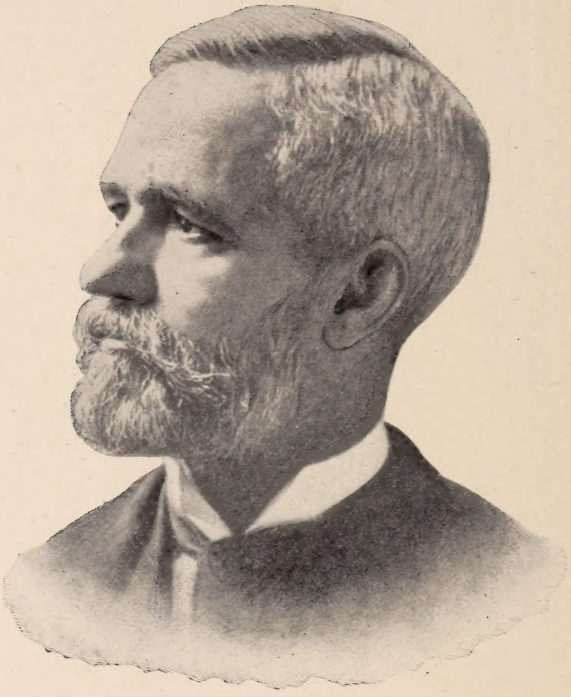

WILLIAM SCOTT THOMPSON,

Died at Washington, D. C., September 25, 1901, Aged 62 years.
President of the American Pharmaceutical Association, 1883–84.
Chairman of the Council, 1886–87 and 1894–1901.

PROCEEDINGS

OF THE

AMERICAN

PHARMACEUTICAL ASSOCIATION

AT THE

FORTY-NINTH ANNUAL MEETING,

HELD AT

SAINT LOUIS, MO., SEPTEMBER, 1901.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

BALTIMORE:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1901.

INITIAL MEETING AT NEW YORK 1851.
AMERICAN
PHARMACEUTICAL
ASSOCIATION
INCORPORATED AT
WASHINGTON, D.C.
FEB'Y 21.
1888.
ORGANIZED AT PHILADELPHIA-1852.

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* Died September 25, 1901.

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W. Virginia. Wm. H. Williams, Wheeling.
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(Appointed by the Local Secretary, as Chairman, in accordance with a resolution of the Association, adopted Sept. 21, 1901.)

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LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	*Samuel M. Colcord*, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass.....	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.....	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.....	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York, N. Y.
Sept. 8, 1857..	Philadelphia, Pa. ...	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C....	*John L. Kidwell*, Georgetown, D. C.	*Edward R. Squibb*, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.....	*Samuel M. Colcord*, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y....	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	*William S. Thompson*, Baltimore.	*Theodore Metcalf*, Boston.
Aug. 27, 1862..	Philadelphia, Pa. ...	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863..	Baltimore, Md.....	*J. Faris Moore*, Baltimore.	*John M. Maisch*, Philadelphia.	*Chas. A. Tufts*, Dover, N. H.	*George W. Weyman*, Pittsburg.
Sept. 21, 1864..	Cincinnati, O.....	William J. M Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.

LIST OF OFFICERS (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass.....	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	*Charles A. Heinitsh*. Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.....	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York, N. Y.....	*John Milhau*, New York.	*Robert J. Brown*, Leavenworth, Kan.	*N. Hynson Jennings*, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa....	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill.....	Ezekiel H. Sargent, Chicago.	*Ferdinand W. Sennewald*, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md.....	*Richard H. Stabler*. Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	*George F. H. Markoe*, Boston.	*Matthew F. Ash*, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873..	Richmond, Va.....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky.....	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	*Augustus R. Bayley*, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.....	*George F. H. Markoe*, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa....	*Charles Bullock*, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877..	Toronto, Can.....	William Saunders, London, Ont.	Ewen McIntyre, New York.	*John Ingalls*, Macon, Ga.	*Emlen Painter*, San Francisco.

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Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga.....	*Gustavus J. Luhn*, Charleston, S. C.	*Frederick T. Whiting*, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879..	Indianapolis, Ind. ..	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y.	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	*William S. Thompson*, Washington, D. C.	William Simpson, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo....	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y..	*Charles A. Heinitsh.* Lancaster, Pa.	*John Ingalls*, Macon, Ga.	Louis Dohme, Baltimore.	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883..	Washington, D. C...	*William S. Thompson*, Washington, D. C.	*Charles Rice*, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis	*John Ingalls*, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	Henry Canning, Boston, Mass.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa.....	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	*Chas. A. Tufts*, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	*M. W. Alexander*, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.....	John U. Lloyd, Cincinnati, O.	*M. W. Alexander*, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich	*M. W. Alexander*, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	*Fred. Wilcox*, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va.	*A. B. Taylor*, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.

LIST OF OFFICERS (Concluded.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891..	New Orleans, La....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill.....	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894..	Asheville, N. C.	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895..	Denver, Colo.	James M. Good, St. Louis, Mo.	Chas. E. Dohme, Baltimore, Md.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kan.
Aug. 12, 1896..	Montreal, Can	Joseph E. Morrison, Montreal, Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parisen, Perth Amboy, N. J.
Aug. 23, 1897..	Lake Minnetonka, Minn	Henry M. Whitney, Lawrence, Mass.	George C. Bartells, Camp Point, Ills.	*Wm. S. Thompson*, Washington, D. C.	Jacob A. Miller, Harrisburg, Pa.
Aug. 29, 1898..	Baltimore, Md	Charles E. Dohme, Baltimore, Md.	George F. Payne, Atlanta, Ga.	James H. Beal, Scio, O.	Miss Josie A. Wanous, Minneapolis, Minn.
Sept. 4, 1899..	Put-in-Bay, O	Albert B. Prescott, Ann Arbor, Mich.	Lewis C. Hopp, Cleveland, O.	Wm. L. Dewoody, Pine Bluff, Ark.	Henry R. Gray, Montreal, Can.
May 7, 1900 ...	Richmond, Va.	Jno. F. Patton, York, Pa.	James H. Beal, Scio, O.	Jno. W. Gayle, Frankfort, Ky.	E. A. Ruddiman, Nashville, Tenn.
Sept. 16, 1901..	St. Louis, Mo.....	Henry M. Whelpley, St. Louis, Mo.	Wm. M. Searby, San Francisco, Cal.	George F. Payne, Atlanta, Ga.	*Wm. S. Thompson*, Washington, D. C.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–1902.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.

PERMANENT SECRETARIES.

John M. Maisch, Philadelphia, 1865–Sept., 1893.
Henry M. Whelpley, St. Louis (acting), August, 1893.
Joseph P. Remington, Philadelphia, 1893–94.
Chas. Caspari, Jr., Baltimore, 1894–96.

GENERAL SECRETARY.

Chas. Caspari, Jr., Baltimore, 1896–1902.

LOCAL SECRETARIES.

For the meeting held in		For the meeting held in		For the meeting held in	
1867	*P. Wendover Bedford.*	1872	*Henry C. Gaylord.*	1877	Henry J. Rose.
1868	*Alfred B. Taylor.*	1873	Thomas H. Hazard.	1878	*Jesse W. Rankin.*
1869	*Henry W. Fuller.*	1874	*Emil Scheffer.*	1879	*Eli Lilly.*
1870	*J. Faris Moore.*	1875	Samuel A. D. Sheppard.	1880	Charles F. Fish.
1871	*William H. Crawford.*	1876	Adolphus W. Miller.	1881	William T. Ford.

LOCAL SECRETARIES.—*Concluded.*

For the meeting held in		For the meeting held in		For the meeting held in	
1882	*Hiram E. Griffith.*	1889	Edward W. Runyon.	1896	Joseph E. Morrison.
1883	Charles Becker.	1890	Charles E. Dohme.	1897	Edw. Shumpik.
1884	Henry C. Schranck.	1891	A. K. Finlay.	1898	Henry P. Hynson.
1885	George A. Kelly.	1892	H. M. Whitney.	1899	Lewis C. Hopp.
1886	*William B. Blanding.*	1893	Henry Biroth.	1900	T. Ashby Miller.
1887	George W. Voss.	1894	W. G. Smith.	1901	H. M. Whelpley.
1888	James Vernor.	1895	Edm. L. Scholtz.	1902	Wm. L. Cliffe.

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91, and 1895–1901. *Chas. Rice*, New York, N. Y., 1891–92. Henry Kraemer, New York, N. Y., 1892–95.

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

	Chairman.	*Vice-Chairman.*	*Secretary.*
1880–81	Jos. P. Remington.	*Joseph Roberts.*	Geo. W. Kennedy.
1881–82	" "	Wm. J. M. Gordon.	" "
1882–83	" "	" "	" "
1883–84	" "	C. Lewis Diehl.	" "
1884–85	" "	*John A. Dadd.*	" "
1885–86	" "	C. Lewis Diehl.	" "
1886–87	*Wm. S. Thompson.*	*H. J. Menninger.*	" "
1887–88	Wm. H. Rogers.	Karl Simmon.	" "
1888–89	Jas. M. Good.	*Emlen Painter.*	" "
1889–90	" "	*Wm. S. Thompson.*	" "
1890–91	" "	" "	" "
1891–92	" "	" "	" "
1892–93	" "	H. M. Whitney.	" "

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.—*Continued.*

	Chairman.	*Vice-Chairman.*	*Secretary.*
1893–94	Jas. M. Good.	H. M. Whitney.	Geo. W. Kennedy.
1894–95	*Wm. S. Thompson.*	"	"
1895–96	" "	Wm. C. Alpers.	" "
1896–97	" "	Jas. M. Good.	" "
1897–98	" "	" "	" "
1898–99	" "	" "	" "
1899–00	" "	" "	" "
1900–01	" "	" "	" "
1901–02	A. B. Prescott.	Chas. E. Dohme.	" "

PAST AND PRESENT OFFICERS OF THE SECTIONS.

Section on Commercial Interests.

	Chairman.	*Secretary.*
1887–88	A. H. Hollister.	*J. M. Colcord.*
1888–89	" "	" "
1889–90	Leo Eliel.	F. B. Kilmer.
1890–91	Henry Canning.	W. L. Dewoody.
1891–92	W. H. Torbert.	Arthur Bassett.
1892–93	" "	" "
1893–94	Wiley Rogers.	Jas. O. Burge.
1894–95	Geo. J. Seabury.	" "
1895–96	" "	Clay W. Holmes.
1896–97	Lewis C. Hopp.	E. D'Avignon.
1897–98	Joseph Jacobs.	Jas. H. Bobbitt.
1898–99	" "	" "
1899–00	Jas. M. Good.	Chas. A. Rapelye.
1900–01	Chas. A. Rapelye.	F. W. Meissner.
1901–02	F. W. Meissner.	E. G. Eberle.

Section on Scientific Papers.

	Chairman.	*Secretary.*
1887–88	T. Roberts Baker.	A. B. Lyons.
1888–89	*Emlen Painter.*	H. M. Whelpley.
1889–90	H. M. Whelpley.	C. F. Dare.
1890–91	E. L. Patch.	C. S. N. Hallberg.
1891–92	C. S. N. Hallberg.	H. W. Snow.
1892–93	C. T. P. Fennel.	F. G. Ryan.
1893–94	L. E. Sayre.	C. M. Ford.
1894–95	A. R. L. Dohme.	Geo. B. Kauffman.
1895–96	S. P. Sadtler.	W. C. Alpers.
1896–97	W. C. Alpers.	V. Coblentz.
1897–98	Edward Kremers.	A. B. Lyons.
1898–99	Henry H. Rusby.	H. V. Arny.
1899–00	Frank G. Ryan.	Caswell A. Mayo.
1900–01	Oscar Oldberg.	Lyman F. Kebler.
1901–02	Lyman F. Kebler.	Jos. W. England.

SECTION ON PHARMACEUTICAL EDUCATION.

	Chairman.	*Secretary.*
1887–88	*John F. Judge.*	H. M. Whelpley.
1888–89	*P. W. Bedford.*	L. E. Sayre.

SECTION ON PHARMACEUTICAL LEGISLATION.

	Chairman.	*Secretary.*
1887–88	R. F. Bryant.	W. P. De Forest.
1888–89	C. W. Day.	J. N. Hurty.

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

	Chairman.	*Secretary.*
1889–90	*P. W. Bedford.*	A. B. Stevens.
1890–91	Wm. Simon.	L. C. Hogan.
1891–92	A. B. Stevens.	" "
1892–93	R. G. Eccles.	" "

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.—*Con.*

	Chairman.	*Secretary.*
1893–94	R. G. Eccles.	L. C. Hogan.
1894–95	Jas. M. Good.	C. S. N. Hallberg.
1895–96	C. S. N. Hallberg.	Jas. H. Beal.
1896–97	" "	" "
1897–98	Jas. H. Beal.	H. Gordon Webster.
1898–99	A. B. Lyons.	C. B. Lowe.
1899–00	C. B. Lowe.	J. A. Koch.
1900–01	" "	" "
1901–02	E. G. Eberle.	J. W. T. Knox.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

	Chairman.	*Secretary.*
1900–01	Henry P. Hynson.	F. W. E. Stedem.
1901–02	F. W. E. Stedem.	Wm. Kaemmerer.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	Albert E. Brown, 14 N. Water St.,	Mobile.
Arkansas,	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
California,	William T. Wenzell, 436 Oak street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
Dist. of Columbia,	Walter G. Duckett, 22d st. and Penna. ave.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
Delaware,	Herbert K. Watson, 803 Market St.,	Wilmington.
Georgia,	Robert H. Land, 812 Broad street,	Augusta.
	Thomas A. Cheatham, Mulberry & 3d Sts.,	Macon.
	Sidney P. Watson, 137 Richardson street,	Atlanta.
Idaho,	David E. Smithson,	Emmett, Canyon Co.
Illinois,	C. S. N. Hallberg, 358 Dearborn St.,	Chicago.
	Henry Biroth, 481 25th St.,	Chicago.
Indiana,	Henry J. Schlaepfer, Second and Main streets,	Evansville.
	Frank H. Carter, 772 Massachusetts avenue,	Indianapolis.
Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	George H. Schafer, 713 Front street,	Fort Madison.
	Silas H. Moore, 525 Fourth street,	Sioux City.

Kansas,	George Leis, 747 Massachusetts street,	Lawrence.
Kentucky,	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
Louisiana,	Alexander K. Finlay, 124 Baronne street,	New Orleans.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edward A. Hay, Free and Middle sts.,	Portland.
Maryland,	D. M. R. Culbreth, 203 E. Preston street,	Baltimore.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Freeman H. Butler, 391 Middlesex street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	Thomas B. Nichols, 178 Essex street,	Salem.
	Francis M. Harris, 814 Main street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
Minnesota,	Wm. A. Frost, cor. Selby & Western aves.,	St. Paul.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
Missouri,	James M. Good, 2348 Olive street,	St. Louis.
	George Eyssell, 1036 Union ave.,	Kansas City.
Nebraska,	Autumn V. Pease,	Fairbury.
New Hampshire,	Andrew P. Freston, 2 Congress Block,	Portsmouth.
New Jersey,	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, 110 First st.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Rudolf C. Werner, 2592 Atlantic ave.,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
Ohio,	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George L. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 47 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
Oregon,	Louis Blumauer, Fourth and Morrison streets,	Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
South Carolina,	Oscar E. Thomas, 164 Main street,	Columbia.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	James O. Burge, Church and High streets,	Nashville.

Texas,	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
Virginia,	T. Roberts Baker, 3101 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
Wisconsin,	Edward Kremers,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Prov. Nova Scotia,	Francis C. Simson, Pentagon Bldg.,	Halifax.
Prov. Ontario,	John A. Clark, E. King street,	Hamilton.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in Government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and this, with a few slight amendments adopted in 1896 and 1900, is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the interest of which for any current year only may be used by the Association for its expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

This article was amended in 1888 and again in 1896 and changed to Article IV., Chapter VIII. As now in force, it reads as follows:

"Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, also any member who shall have paid to the Treasurer annual dues for thirty-seven years, shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one

(until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) and again in 1896 (Proceedings, page 17) so as to apply also to those who have been members for over twenty years (see Chapter VII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is seventy-one, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884 (p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same Fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 98 of the present volume shows that on July 1st, 1901, the value of the Life Membership Fund was $12,316.14 (face value of securities only given), of which sum *the interest for any current year only may be used by the Association for its expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize*.

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; for 1891, to John U. Lloyd; for 1897 to Albert B. Prescott and Jas. W. T. Knox; for 1898 to Virgil Coblentz; for 1899 to Henry Kraemer; and for 1900 to Edward Kremers and Oswald Schreiner.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1901 (Proceedings, p. 98), its reported value was $765.32 (face value of securities only given). The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Robt. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, $50 to the same investigator in 1893, and $50 again to the same investigator in 1894. In 1896 the sum of $22.33 was paid to the Committee on Indicators for material used in their investigations.

The original sum of $1107.81 ($525+$582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1619.15 (face value of securities only given) on July 1, 1901 (see Proceedings, p. 91). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28). On July 1, 1897, the above bonds were redeemed, and six (6) 4 per cent. bonds of the same company, each for $500.00, taken at par and accrued interest.

At the Richmond meeting in 1900, the Chairman of the Council and the Treasurer were instructed to sell the bonds belonging to the General Fund and to place $1000.00 of the proceeds into the treasury and the balance in the Life-Membership Fund (see Proceedings, 1900, p. 18).

Two of the bonds belonging to this Fund were sold February 23, 1901 for $1012.56, leaving four bonds, each for $500.00, on hand July 1, 1901 (see Proceedings 1901, p. 99).

PRIZES.

The resolutions adopted August 15, 1893 (see page 16, Proc. 1893) were amended September 1, 1898 (see page 98, Proc. 1898) to read as follows:

Resolved, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of $100.00, and apportioned as follows: $50.00 for the first, $30.00 for the second, and $20.00 for the third prize.

Resolved, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

Resolved, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper

The following resolutions were adopted September 1, 1898 (see page 98, Proc. 1898).

Resolved, That a prize be established to be known as the "Hermann Hager Memorial Prize," and of the value of $50.00. That in bestowing said prize, preference shall be given to contributions on pharmaceutical science or art, as distinguished from those on allied branches, though it shall not be confined to such. That said prize shall be awarded only when, in the opinion of the Committee on General Prizes, a contribution shall be deemed worthy of the award.

Resolved, That a prize be established to be known as the "John M. Maisch Prize," of the value of $50.00. Said prize to be awarded for research work in pharmacognosy, only on the recommendation of the Committee on General Prizes.

Resolved, That no one of the general Association prizes shall be awarded to the writer of a paper for which either the Hermann Hager Prize or the John M. Maisch Prize has been given.

For names of members of this Committee see page v.

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PREFATORY NOTICE.

At the forty-second annual meeting of the Association, held at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at the General Session held September 8, 1894.

With the view of securing for the Proceedings as wide a distribution as possible, and to enable members to complete their sets at very low figures, the Council, at the forty-third annual meeting held at Denver, Colo., decided that the price of the Proceedings for 1890 and all previous years be reduced to one-half of that heretofore published. The Association at the General Session held on August 20, 1895, approved the action of Council, and the Committee on Publication offer the different issues at the following rates:

		PAPER COVER.	BOUND CLOTH.
1851, 1852, 1853, 1854, 1855	each	$ .13	$
1857	"	.20	.25
1858, 1864, 1865	"	.38	
1858, 1860, 1862, 1863, 1864, 1865	"		.50
1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873	"	.50	.75
1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883	"	1.25	1.50
1884, 1885, 1886, 1887	"	1.75	2.00
1888, 1889, 1890	"	2.50	2.75
1891, 1892, 1893	"	5.00	5.50
1894	"	6.00	6.50
1895	"	5.50	6.00
1896, 1897, 1898, 1899, 1900, 1901	"	5.00	5.50

The reduced prices on all volumes published prior to 1891 do not include free delivery.

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For any two or three volumes a discount of 10 per cent. on the above prices.

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For any more than thirty-two volumes a discount of 60 per cent. on the above prices.

1856 and 1859 are out of print; none published in 1861.

Beginning with the first issue, in 1851, the actual cost of partial or complete sets—bound in cloth as far as on hand—will be as follows:

To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.	To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.	To and Including	Number of Vols.	Price by Single Vols.	Price the Set Net.
1855	5	$0 65	$0 52	1873	20	$9 90	$5 94	1888	35	$35 65	$14 26
1857	6	0 90	0 72	1874	21	11 40	6 84	1889	36	38 40	15 36
1858	7	1 40	1 12	1875	22	12 90	7 74	1890	37	41 15	16 46
1860	8	1 90	1 52	1876	23	14 40	7 20	1891	38	46 65	18 66
1862	9	2 40	1 68	1877	24	15 90	7 95	1892	39	52 15	20 86
1863	10	2 90	2 03	1878	25	17 40	8 70	1893	40	57 65	23 06
1864	11	3 40	2 38	1879	26	18 90	9 45	1894	41	64 15	25 66
1865	12	3 90	2 63	1880	27	20 40	10 20	1895	42	70 15	28 06
1866	13	4 65	3 26	1881	28	21 90	10 95	1896	43	75 65	30 26
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1872	19	9 15	5 49	1887	34	32 90	13 16				

Orders for Proceedings should be sent to the General Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the General Secretary on receipt of $2.

Blank forms of application and recommendations for membership may be obtained from the General Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Wm. L. Cliffe, 2778 Kensington Ave., Philadelphia, Pa.

The fiftieth annual meeting of the Association will convene at Philadelphia, Pa., on the second Monday (8th day) of September, 1902, at 3 o'clock, p. m.

MINUTES

OF THE

FORTY-NINTH ANNUAL MEETING.

The forty-ninth annual meeting of the American Pharmaceutical Association was held in the city of St. Louis, Missouri, September 16–21, 1901, with headquarters at the Southern Hotel, on Broadway, where the several sessions were held. The attendance was good, considering the disturbance of the country over a great national calamity, and the number of new members enrolled was an encouraging feature, the list of applicants being the largest for quite a number of years past. The hospitable city of St. Louis, through its representative citizens and five hundred pharmacists, extended a warm welcome to the Association, while the weather turned off clear and cool, as though to disprove the reputation of the great city by the Father of Waters of being one of the hottest places in the country.

First Session—Monday Afternoon, Sept. 16, 1901.

The first general session was called to order at 3 : 15 p. m. in the ordinary of the hotel, with President Patton in the chair.

The chair explained that the Hon. Rolla Wells, mayor of the city, had been expected to be present to deliver an address of welcome, but had been detained, evidently, and as it was past time for the session to open, he would not ask the Association to wait longer.

Mr. H. M. Whelpley, of St. Louis, the Local Secretary of this meeting, then arose and said :

Mr. President, and Members and Friends of the American Pharmaceutical Association :

St. Louis and the State of Missouri feel proud to have you with us on the occasion of your forty-ninth annual meeting. We had expected the mayor to be here and extend to you the hospitality of the city, but we have with us one who, by his business connections and past honors, has a right to speak for the city of St. Louis and for the wholesale drug trade of the city and its allied interests, and I have the honor to introduce to you Col. C. P. Walbridge, ex-mayor of the city of St. Louis.

Col. Walbridge acknowledged the introduction and said :

Mr. President, Ladies and Gentlemen:

The mayor asked me to make his excuses. He is engaged in arranging memorial services in honor of our late distinguished President, and I am sure that any American audience would excuse a mayor engaged at this time in preparing for a tribute to the most beloved of American Presidents. [Applause.]

But I am not here to speak for the mayor or to speak for the city. Dr. Whelpley asked me to speak for the wholesale drug trade and allied interests.

Of course we welcome you. We need you. You are necessary to us. We could not do other than extend to you a most cordial welcome. But I should be untrue to the people I represent and to myself if I placed our welcome solely upon a selfish ground. I should be equally untrue if I eliminated entirely the element of selfishness, because where one element is co-dependent upon another you cannot eliminate the element of selfishness.

The wholesale drug trade and kindred trades are represented as a rule by men of public spirit. They are ever ready to encourage any movement which benefits the whole community. And we know of nothing that is more likely to benefit the whole community than the elevation, the strengthening and the bettering of the practice of pharmacy. We welcome you, believing you are engaged in that work, but we believe at the same time that it is right for you to consider ways and means for the obtaining of better compensation for the services which you render the public. I know of no profession, I know of no calling, requiring the same degree of skill and responsibility which is so poorly paid as the practice of pharmacy. It is right that you should consider how to secure a fair and just compensation; and I hope, gentlemen, the time will come when the three branches of this trade, the manufacturer, the wholesaler and the practicing pharmacist, will stand as one man to secure from the community just compensation for the technical and responsible duties which they perform.

In this spirit, on behalf of the wholesale druggists and kindred interests, I bid you a cordial welcome; and I beg to say to you that if there is anything that the wholesale trade of St. Louis can do to increase your comfort or your pleasure, touch the button and the wholesale trade will respond. [Applause.]

THE PRESIDENT: Col. Walbridge, on behalf of the Association, I desire to thank you heartily for the cordial words of welcome you have just uttered.

MR. WHELPLEY: Mr. President and Gentlemen, the pharmaceutical profession of St. Louis is well represented by many able members at the present time, and one of them, Mr. James M. Good, will extend you a cordial greeting on behalf of the profession in St. Louis.

Mr. Good said:

Ladies and Gentlemen, and Fellow-members of the American Pharmaceutical Association:

It has frequently fallen to my lot to respond to addresses of welcome which have been extended to us as we have visited different cities throughout the country. It seems quite appropriate, therefore, that the reverse should be the case to-day.

Some of you remember a little scene in the Jefferson Hotel, at Richmond, Virginia, which was enacted sixteen months ago. There was a good-natured contest at that time as to the place of meeting in 1901. We suspect that those who were contesting with us for this honor were incited mainly to see how far they could make us go. We did not go any further, however, by way of promises than we are prepared now to fulfill, I think.

Now, ex-Mayor Walbridge has extended to you the greetings of the wholesale druggists, and I am asked to speak for the retail trade. The very energetic work that has been done by your Local Secretary, and by the judicious selection of committees, has

aroused rather an unusual degree of interest among the retail druggists of St. Louis. That is evidenced by the attendance here this afternoon, and by the large number of applications for membership which have been sent in. But for our entertainment of you in proper form, such as is befitting you and properly representing St. Louis, we would have been very much at a loss without the aid of the wholesale drug-trade and its allied interests, for whom Col. Walbridge has spoken.

Now I am aware—because I have attended these meetings quite regularly—that the members of this Association come here primarily for work, and the little programme which has been handed around may seem to offer many diversions to take the members away from the more serious business of the meeting, but we think we have arranged it in such a way that the entertainments will not interfere with the business.

Among the committees appointed you will find one on places of interest. Of course, you have all heard about Shaw's Garden and the Eads Bridge, but I suspect this committee has overlooked some of our objects of interest. One thing to which we do not need to call your attention particularly is the chocolate color of the water here. Of course we try to overlook it ourselves, but strangers when they come here are rather impressed with it. I am reminded about what the late Senator Ingalls said about the Missouri River water. He said it was too thick to drink and not thick enough to cultivate! Another object of interest is that ally of the Boers of South Africa, the Missouri mule. We have him very much in evidence. He is rather a sad animal in his reflective mood. He is said to be so because he has no pride of ancestry and no hope of posterity. He is a treacherous beast, this Missouri mule, and they say he will serve a man faithfully for years in order to get a crack at him at last. He is an object of interest, I assure you.

A week or two ago some of our representative men drove a stake in the ground at Forest Park out here a few miles away. It is a particular object of interest. I don't know that it is a thing of beauty, but like Katisha's shoulder, they say men will go miles to see it. I believe Kansas has put in a claim for a hundred and sixty acres of ground out there for an alfalfa field, and Colorado proposes to reproduce Pike's Peak for some of its mining interests.

I don't think you need any better evidence of the interest of the retail druggist of St. Louis than what you have already observed. I have been asked to say a word for the College of Pharmacy, but I do not propose to enter into a discussion of the merits of the college at this time. I will simply say that the members of the college Faculty and all those representing it extend to you a cordial invitation to visit the institution. It may not be as interesting to go there as on some of the other tours mapped out for you, but we will be glad to see you there and hope you will come. I think it has been arranged for you to go there Tuesday evening, before going to the Exposition.

Referring to a very cordial editorial in our *National Druggist*, which is something in the nature of a greeting and an invitation at the same time, I feel like quoting from it to the effect that we hope to make this an occasion which will never be forgotten by those who are here and those who are not. [Laughter.] Unfortunately the occasion is indissolubly associated with a great national bereavement, and we cannot recall this meeting without recalling the great sorrow and solemnity of the occasion; but I extend greetings of the retail druggists, and assure you we are ready to co-operate with you, either for work or for pleasure. [Applause.]

MR. WHELPLEY: Many of the Missouri pharmacists, as well as a large portion of the citizens of the State, live within the corporate limits of the city of St. Louis, and we might continue indefinitely to call upon representative men of the city; but not all the good pharmacists or good citizens of the State are citizens of St. Louis. We have many of both classes in other portions of the State, and we are fortunate in having with us this afternoon an ex-president of the Missouri Pharmaceutical Association, who is always looked upon as a representative of Missouri pharmacy, as well as a tried and trusted

member of this Association. I refer to Mr. William Mittelbach, of Boonville, and I will ask him, on behalf of the pharmacists of the State, to extend their welcome.

MR. MITTELBACH: Mr. President, and ladies and gentlemen of the American Pharmaceutical Association. On behalf of the Missouri Pharmaceutical Association and the pharmacists of the State generally I bid you welcome. Long have we looked forward to this time when you should meet again with us, anticipating the renewal of old friendships and the making of new ones, and anxious to learn more of our profession by the aid of your wise counsels. We look upon the American Pharmaceutical Association as the backbone and sinew of American pharmacy, and feel highly honored that you have again come to this the banner city of the West after an absence of twenty years from the State and thirty years from the city. I again bid you welcome, and hope in the future you will not stay away so long. We trust that this meeting will be a pleasant and profitable one to you all. [Applause.]

THE PRESIDENT: Ladies and gentlemen, we have had two cordial addresses of welcome from gentlemen representing the city of St. Louis and one representing the State of Missouri. Now I will ask Mr. C. B. Lowe to make a suitable reply to these addresses on behalf of the city.

Mr. Lowe spoke as follows:

Ladies and Gentlemen, and Members of the American Pharmaceutical Association:

The President has imposed upon me the pleasant duty of responding to these hearty speeches of welcome.

It is not mine to reason why,
But simply mine to make reply. [Laughter and applause.]

We have already experienced some of the warmth of this reception, and if it goes on increasing to the end of the week we will feel like the Queen of Sheba when she visited Solomon in all his glory—that the half had not been told.

As we rode over the bridge last night and saw the illumination of the city we thought it had been prepared in our honor, but they told us it was only the customary thing in St. Louis. We also observed that the doors of the city were thrown open to us—some doors that you would find closed in Philadelphia on Sunday. But although the doors of our saloons are closed on Sunday in Philadelphia, the doors of our hearts are open all the week.

I am told that among the molecules that go to make up society in St. Louis the pharmaceutical molecules are not the least—as witness such names as Francis Hemm, Jas. M. Good, Dr. Claus, and others I might mention. But we all know that the pharmacist is not appreciated at his full worth by the community in which he lives, however much we, as fellow-pharmacists, may recognize that fact.

All honor, we say, to the pharmacists of St. Louis! We are glad to be here and to shake hands with you. We are glad to enjoy your hospitality; and we shall go away with a warm place in our hearts for the retail and wholesale pharmacists of St. Louis. [Applause.]

The chair called on Mr. Payne, of Georgia, to respond to the kind words of welcome on behalf of the Missouri pharmacists spoken by Mr. Mittelbach.

MR. PAYNE: *Pharmacists of Missouri:* We thank you for your hearty welcome, a welcome which has been made still more glorious by the presence of your fair wives and

daughters. Your generous hearts, which are so ready to share their happiness with others, are well typified in your two splendid rivers, which, gathering great richness and fertility from your fields, flow onward towards the Gulf, scattering their treasure over a large part of the rich Louisiana Purchase—a purchase which, in 1903, every father, son, brother and sister of the American Pharmaceutical Association hopes to join you in celebrating.

In the section of the country from which I come the sugar-cane and the cotton are ripening in the sun, the quail is piping in the hedgerow, and from the top of the highest bough of the apple tree the mocking-bird is pouring out his soul in song. But we do not forget in that section the many things we owe to Missouri; and even the "Missouri mocking-bird" is one that we treasure and esteem most highly. This songster is not of the delicate character of the feathered songster of the South, but he has a sturdy warble, with a very good *pull*, and we all appreciate that. [Laughter.]

Down in our section of Georgia we have a well-known negro preacher by the name of Walker, who was once an ignorant plowboy down in "Punkin Holler." One night he went forth to pray for the forgiveness of his sins, so they say, and he heard a voice from above (as he thought) calling, "Wa-Walker! Wa-Walker! Go preach! Go preach!" and he thought it was a command from heaven to go and spread the gospel; but his friends said it was only the voice of the Missouri mocking-bird, which our friend Mr. Good has spoken of so affectionately. [Laughter.]

Gentlemen, we again thank you for your whole-souled, hearty welcome. [Applause.]

THE PRESIDENT: The next thing in order is the reading of the President's address, and I want to say for your comfort and encouragement that I do not intend to treat you to a long review on abstract science or the events of the last century. It is hard to get much wheat out of straw that has been threshed over forty-eight times. Some truths, however, can be stated and restated, and never lose their power. If any of you get tired and want to run out, you can do so—that is what I would do. [Laughter.]

The President then called First Vice-President Beal to the chair, while he read his address as follows:

Fellow-Members, Ladies and Gentlemen:

With words of greeting and hearts attuned to thankfulness for the privilege, we welcome you to this, our forty-ninth annual meeting.

We again meet in a city where, thirty years ago, the American Pharmaceutical Association convened in annual assembly. The time intervening between then and now has been freighted with important events, and yet, in looking back over the years that have elapsed, how short they seem. Our estimate of time, after all, depends largely upon the point of view. The youth, with bright-eyed expectancy, looks forward to the coming years as remote, vague and dim; but he who has reached the meridian of life looks back in retrospect to the vanished years as but of yesterday.

Another period of more than a year has swiftly passed, and we have gathered again to renew social ties, discuss pharmaceutical progress, and lay our plans for future achievements. We have listened with delighted ears to the cordial words of welcome uttered by the voice of authority, and feel that here, in this beautiful city, we are among friends and brethren.

St. Louis, located on the banks of the "Father of Waters," whose tributaries drain a mighty domain, and upon whose broad bosom the products of an empire are transported, has kept pace with other cities in the growth of its urban population and in enterprise, and ranks as a great commercial entrepot.

Referring to a bit of personal experience or history, the speaker, thirty-five years ago,

sought this city as a place wherein to achieve fame and fortune. He found in their stead that for which he was not looking, namely, a severe attack of bilious fever, and, after a residence of three months, prudence suggested a change of climate, and he returned to the "Monumental City," whence he came. Since that time he has made, however, several other visits, and in each succeeding one has been more and more forcibly impressed with the wonderful advancement the city has made. She is, indeed, he worthy child of a century whose record of achievement is unequaled.

What mighty changes in all that relates to man have taken place during the last hundred years! Even to contemplate them staggers the mind by reason of their infinite variety and multiplicity.

When machinery propelled by steam was set to do the work of human hands, even more hands and greater skill could not possibly enter the field of successful competition. The restless mind of man prompted his inventive ingenuity to make a more perfect machine, and cheapen the cost of the article by greater production.

The application of electricity to the arts of life is one of the signal events of the age. It has been difficult to keep posted on the multiform applications of electricity to the arts and industries, so rapid has been the succession of inventions.

In telegraphy, the duplex has developed into the synchronous multiplex system, by means of which seventy-two distinct messages are transmitted over the same wire at the same time, either in the same or opposite directions.

The telephone, the arc and incandescent lights, the electric street car, the Biograph, the Roentgen Ray, the graphophone, wireless telegraphy, all these, and the names of Edison, Bell, Tesla, Marconi and others associated with them, stand out as beacon lights and mark the stages of progress.

This bringing together of the ends of the earth, which steam and electricity have accomplished, has stimulated an almost incredible development in the art of printing, by means of which the news of the world is put into every home through the columns of the newspapers, so that mankind are no longer strangers to each other because of distance and separation, but are united at least by knowledge of, and interest in, each other's affairs.

The advancement in medicine, pharmacy, and surgery, has been no less marked and phenomenal. This is evidenced by the fact that it requires twelve sections to carry forward the work of the American Medical Society. The successful accomplishment of the work, in many of these divisions, depends upon that all-embracing science, chemistry. This science, which relates to the peculiar properties of matter, the properties of elementary substances, and the laws governing their relation to each other, seems to be the foundation upon which all other sciences are based. From the time of Tubal Cain, the Father of Metal Workers, to the present day, the progressive steps in the evolution of this science are easily traced. At first, the practical part of chemistry existed before the theoretical. It is to Lavoisier we are indebted for the classification and arrangement of the then known chemical facts into a system unparalleled for its precision, extent of view, and logical accuracy. From that moment chemistry marched onward with giant strides.

Indeed, the history of chemistry is but the history of all that relates to man in his life and progress. The prevention of disease, the preservation of health, lengthening of human life, the development of the arts and industries, all of these come within the scope and are dependent upon a knowledge of the laws of chemistry. Its relation to Physiology, Bacteriology, Hygiene, and Sanitation, is well known. Its application to Dietetics, in placing the subject of food and its preparation on a scientific basis, tends to promote man's well being and comfort. The workers in this field of research and investigation may well be regarded as the benefactors of the race. To undertake to mention by name the host of men eminent in chemistry would be to expose oneself to the liability of regrettable omission.

During the first third of the past century opium and distilled spirits were the only known anæsthetics. The victim of a surgical operation was given a stupefying potion of whiskey or laudanum, strapped to the operating table, and the surgeon proceeded with his work.

A year after the discovery of the anæsthetic properties of ether, a Scotch surgeon, Sir James Simpson, made known a like power in chloroform.

Of more recent discovery, and equally as important, is the advance made in antiseptic and aseptic surgery.

The biological investigations entered into in recent years have produced some surprising facts as to the origin of zymotic and germ diseases. With positive knowledge of the cause of these maladies, the preventive agency is sure to follow. We have this illustrated in Dr Jenner's wonderful discovery and the more recent diphtheritic antitoxins.

But preventive measures, no matter to what stage of development they may attain, will never take the place of curative remedies, hence the pharmacist need give himself no concern about being displaced. It is necessary, however, that he possess the power of rising to the occasion and adapting himself to changes as they occur. Change is the law of life, as it is the earnest of any improvement, and in pharmacy, as elsewhere, we find it.

As it has been justly observed, "Total freedom from change would imply total freedom from error, which is the prerogative of Omniscience alone."

We have mentioned but a few of the many inventions and discoveries which the century now vanished into the past has bequeathed as a rich heritage to the present. It is left for us to profit by that which we have received, and, as we may have ability, to add to it, aiding and abetting whatever tends toward the advancement and uplifting of mankind.

Since we met in Richmond, pharmacy at large has lost two of its most distinguished exponents, and we mourn the loss of two of our most valued members.

Dr. E. R. Squibb stepped upon the stage at a period when cupidity prompted to the marketing of the most inferior of pharmaceutical products. At that time the quality of much of the manufactured medicines, in this country at least, had reached low-water mark.

Dr. Squibb's recognized ability and well known integrity raised the standard and set in motion forces tending toward better pharmacy, the influence of which is felt unto this day.

His useful and valuable life extended beyond the allotted span. He died full of years and honors.

Stricken down in the full flower of his eminent usefulness, at the zenith of his matured faculties, with, apparently, before him many years of service to be devoted to his fellowmen, the announcement of the death of Dr. Rice came as a surprising and distressing shock to us all.

His brief illness, terminating fatally, marks a loss to pharmacy that is irreparable.

All that constituted true greatness was found in the character of this master of his art. His self-sacrificing disposition, his ready willingness to serve, his modesty and generosity, his care for the interest and honor of others rather than his own, endeared him to all who had the honor of his acquaintance.

Wise in counsel, indefatigable in industry, a sure guide in untrodden paths, he laid the foundation for the revision of the United States Pharmacopœia in 1880, and as chairman of the Committee for the two subsequent revisions, he left his impress upon that great work, which, in its scientific accuracy, its general usefulness, and the excellence and efficiency of its resulting preparations, stands to-day not only the peer, but the superior of all works of similar character.

We mourn the death of Charles Rice as one of nature's noblemen.

"None knew him but to love him,
None named him but to praise."

This Association was suitably represented at his funeral by a Committee, consisting of Mr. George J. Seabury, Mr. Caswell A. Mayo, and Dr. E. H. Bartley.

In the early summer there died in Philadelphia, one whose ability as a writer made him widely known, and whose industry as a worker commanded admiration. These qualities ought to have given him a high niche in the hall of pharmaceutical fame, had not his erratic life and lack of definite purpose counteracted what would otherwise have been a brilliant career. I refer to Hans M. Wilder.

During the past months a more buoyant feeling, as of increased prosperity, has seemed to pervade all branches of the drug trade. While the general increase of business interests throughout the country may be partly responsible for this, yet an important factor in it was the removal of the exacting, vexatious and burdensome stamp tax.

For valuable work in this direction we are indebted to our Committee on National Legislation, by means of whose efforts, in conjunction with those of similar Committees of allied interests, what we so earnestly sought was finally accomplished.

We would extend to them our hearty and sincere thanks for their share in the accomplishment of a result so beneficent and so general in its application.

That this Committee might wield more influence in National Legislation affecting our interests, I would recommend that it be made a permanent one, and that it consist of three members, the Chairman to reside at the seat of the General Government, and the other two to represent respectively, a large Eastern and Western city.

Much criticism has been indulged in recently as to the attitude and methods of teaching of our colleges of Pharmacy. We naturally look to these institutions as the leaven which is to permeate the whole lump and elevate the standard of quality.

A growing suspicion that the colleges are not fulfilling their task in the highest degree prompts this animadversion and criticism. We are to judge of a tree by its fruits, and we can determine the character of an educational institution by the quality of its graduates. The possibility of any of our colleges having diamonds given as material to work upon may be remote, but the teacher who is set to polishing pebbles is to be deeply commiserated.

By average, five at least of our pharmaceutical schools have been in existence half a century. Are we to infer that during all of this period they may have been given only pebbles to polish? Surely not. Yet, we are told that only through the curriculum of the schools is a pharmaceutical education possible and a practical knowledge of the art to be secured, and that there are in the shops comparatively no educated pharmacists competent to instruct apprentices. Is this to be accepted as the result of fifty years of systematic collegiate instruction? If so, it certainly is not flattering testimony to the efficiency of the system.

It is generally acknowledged among members of the profession, that no single cause has operated more to lower the status of pharmacy in a scientific aspect than the insatiable business rivalry of the colleges, creating the impression and fostering the fallacy that the practice of pharmacy affords an open and easy way to the speedy acquisition of wealth, making a surer and larger return on a smaller investment than that of any other profession or occupation.

The true sentiment in regard to pharmaceutical education found expression in a resolution passed by this Association in 1871, declaring that "colleges of pharmacy should be controlled by pharmacists," and that "a practical experience in the shop" should be a *sine qua non* among the requirements for graduation. The force and reasonableness of this is as apparent to-day as when first expressed, and it has been repeatedly emphasized by demanding that this term of "practical experience" shall not be less than four years.

The growth of our country, in extent and population, has however afforded ample opportunity for the establishment of pharmaceutical schools on a purely business basis. In these the pecuniary interest is held paramount to all others. Seeking to share the patronage of the older colleges, they have proclaimed an easier road and shorter cut into the realms of pharmaceutical science and practice; promised to make, under a newer method of instruction, better qualified pharmacists than the tutelage of the shop and the then-existing institutions could possibly supply; and even claimed that it was not an essential requirement that the student, either before or during his term of tuition, shonld be familiar with the inside of a drug store.

This swift and superficial method of training is to be substituted for four years of continuous exercise in the manipulation of an art which the limits of an average life, filled with uninterrupted labor and study, cannot compass.

Such teaching bore its legitimate fruit in increasing the number and decreasing the qualifications of those engaged in pharmacy, making necessary the enactment of laws and the establishment of boards to protect the profession against a great incoming tide of incompetency.

A course of commercial instruction, now adopted by some of our colleges, is but a substitute for the training the youth would naturally receive in the daily business transactions of the store. No better illustration can be presented of the invaluable resources of drug store training to the earnest youth wishing to acquire an intimate knowledge of the practice and science of pharmacy than is found in the histories of Scheele in the old world, and of Procter in the new. All honor to the earnest, faithful teachers who are conscientiously striving to do their duty by those committed to their charge. Pharmacy owes to such a debt of gratitude.

A move in the right direction towards raising the standard of quality, and demanding better training on the part of those who enter the curriculum of the college, would seem to be indicated by the formation of the Conference of Pharmaceutical Faculties, whose influence in this direction will no doubt be felt in the future. The hope of bettering conditions for the pharmacist lies in bettering the individual. Any scheme short of this cannot be permanent or effective. The joy of success, or the chagrin of failure, will be measured by the qualities of earnestness, ambition and industry, or the lack of them, in the individual. The whole matter rests with the man.

One would think that an organization such as the American Pharmaceutical Association, whose aim is to aid and benefit, would attract to itself all who would naturally be interested in matters relating closely to their material prosperity, intellectual growth and progress. Such, however, does not seem to be the case. The backwardness of the pharmacist in taking advantage of the means provided to aid him must be due to that apathy which is now so pronounced, in contradistinction to the spirit of intense strenuousness manifested in so many directions.

This is an age of sharp contrasts. A characteristic of human nature much commented on and denounced is the selfish and grasping greed of acquisition; but, on the other hand, we have the spirit of altruism discussed, debated, and never more largely practiced than at present. Each of these principles has its limitations and uses. The selfishness of money-getting prompts to that degree of rivalry which means progress. Altruism would make all men equal, but that can never be until human nature is radically changed. Some men will achieve success under the most adverse circumstances; others fail when all the conditions are highly favorable.

This emphasizes the fact that all are not born equal so far as mental endowments are concerned. The finest conception of brotherhood, born of religious zeal and enthusiasm, animated the early Christian church, but the effort to have all things in common proved a dismal failure.

It will always be true that "Some men are born great, some achieve greatness, and

some have greatness thrust upon them," but, alas, for the other "some"—and their name is legion—whose lives are never signalized by even the effort to achieve. From this class even pharmacy is not exempt. Content in a narrow sphere, they take no advantage of any of the Associations, connection with which would tend to better their condition by aiding them to qualify for higher service.

Organization is now esteemed the panacea for the various ills affecting the body politic. Many of the things desirable to possess are only to be attained by concerted effort. This is especially the case in securing the enactment of just laws, in providing means for man's intellectual and spiritual welfare, and in the distribution of charity and works of philanthropy.

Organizations, however, that have for their object the improvement of man's material condition, are beset by many obstacles. To insure success along this line, limitations and restrictions are imposed on the individual, his liberty is abridged, his freedom of action restrained, and his individuality ignored. The higher you raise man in the plane of intelligence, the less willing he is to submit to conditions that organizations seem to make necessary, even when the promise of prosperity seems likely of realization.

The American Pharmaceutical Association claims the fealty of its members on the ground that it is free from any of the above drawbacks. It abridges no man's liberty, and imposes no unnecessary restrictions, but aims to benefit and uplift the pharmacist by qualifying him for higher usefulness in the service of his fellowmen.

The obligation is laid upon us all to do the best we can, and in the fulfilment of that obligation is the hope and promise of civilization. Let us then endeavor to perfect ourselves in our calling, by employing all the means within our reach, feeling assured that our prosperity will be commensurate with our efforts, and that our compensation is to be gauged by the service we render.

One of the most important moves this Association has made in recent years is the establishment of the department of Practical Pharmacy and Dispensing. It has in it the potency and promise of great benefit to the members of the Association. Let us give it our earnest support and assistance that it may fulfill in the highest degree our expectations.

The delegates appointed to attend the section of Materia Medica, Pharmacy and Therapeutics of the American Medical Society, worthily represented this body, and were honorably recognized in the selection of one of our delegates, Mr. C. S. N. Hallberg, as Secretary of that Section.

The American Medical Association is a large body and wields an amount of influence proportionate to its size. The affiliation of the dentists with this Association has gained for them official recognition by the general government in the creation of a corps of dental surgeons for the United States Army.

This is quick recognition for a profession of recent development, and leads to a query why pharmacy has not come to its own by taking a position as a distinct profession. It is co-equal with medicine in antiquity and importance. Possibly its devotees have been too modest in pushing its claims, for, up to the present time, it has received but scant recognition from the government.

We cannot do better than to send to each annual meeting of the American Medical Society a delegation of our strongest and best men to represent us in the section of that body in which we are especially interested.

While on the subject of representative delegations to allied bodies it would not be amiss to suggest the propriety of exchanging representatives with our brethren across the water. Now that the trip across the Atlantic can be made safely, quickly and cheaply, there seems to be no reason why we should not exchange delegates with the British Pharmaceutical Conference.

Our thoughts at the present time naturally turn to commemorating next year the fiftieth anniversary of our existence, and preparing some fitting testimonial to the memory of the Father of American Pharmacy, William Procter, Jr.

Considerable discussion has been had as to the particular form of this testimonial—a monument, scholarship and research laboratory having been in turn suggested. The last would certainly be the most worthy our consideration, but it would involve an expenditure far beyond our means, and cannot be entertained. Besides, the ground in this direction is already somewhat covered in the fine equipment of research departments in some of our pharmaceutical manufacturing establishments. Much has already been accomplished, and many important discoveries made in new remedies.

The public press announces the promise from one of our multi-millionaires of a contribution to establish such a laboratory and an endowment sufficient to support it.

Given ample means and thorough equipment, research might at the beginning be confined to biological lines, but would surely take in not only the investigation of diseases, but remedies as well.

Pending the fulfillment of such a promise, the next most fitting memorial to commemorate an event and perpetuate a memory would be a medal, bestowed by this Association, for meritorious work along the lines laid down in awarding the Hanbury and Flückiger medals.

A prize so valuable as this would be to the recipient would afford an ample incentive to the best work in the field of pharmacy. This medal, known as the Procter medal, would serve to keep alive the memory of him whom we, as pharmacists, delight to honor.

The keynote of the coming years, as that of the past, must be progress; for no matter what has been attained, yet, as it has been truly remarked, "The wisest man may be wiser to day than yesterday, and to-morrow than to-day." The future waves alluringly its unwon laurels and invites to fields yet unexplored, fruitful with the promise of rich rewards.

And now, in conclusion, permit me to express my grateful appreciation of the high honor you have conferred upon me, and to ask your consideration and assistance while presiding over your deliberations.

Long-continued applause followed the reading of the address of the President.

THE VICE-PRESIDENT: Gentlemen, you have heard the address of your President. What is your pleasure?

Mr. Mayo moved to refer to a committee of three for consideration and report at a later session, and the motion was seconded by Mr. Sloan, and carried.

The President resumed the chair.

The Secretary read the following communication that had come to his hands from Mr. Eugene Du Puy, of Detroit, one of the original members of the Association, having joined in 1852, stating that Mr. Du Puy would celebrate his eighty-fourth birthday on Sept. 17th (to-morrow).

DETROIT, MICH., *August, 1901.*

Fellow Members of the Ameriean Pharmaceutical Association:

I am improving my opportunity of sending to you my patriarchal greetings by our fellow member, Mr. J. W. T. Knox, of Detroit, who intends to attend the prospective annual meeting of our Association in September next at Saint Louis.

May the original purpose of said Association be adhered to and enlarged, for the benefit of our profession at large in our western hemisphere.

Respectfully yours,

EUGENE DU PUY,
One of the Original Members.

The Secretary also read the following interesting letter from Prof. A. B. Prescott, late President of the Association, which explains itself:

To President Patton, American Pharmaceutical Association:

I desire to express to you and to my fellow members the regret I feel in being absent from the St. Louis meeting. My visit to England this summer, a long-deferred visit of observation, does not leave me time to meet with you this year. The approaching date of the annual reunion brings to remembrance the friends who work together in the Association, and the week in dear old hospitable Richmond last year.

Among the people I have been glad to see in the United Kingdom none have been of greater interest than the pharmaceutical people, and none have given heartier welcome to me as a visitor from the United States. At the annual meeting of the British Pharmaceutical Conference in Dublin on the thirtieth of July, when I presented the greetings of the American Pharmaceutical Association as a body representative of the pharmacists of the United States, the reception given to this message was such that no one could be in doubt of its sincerity. The good-fellowship of all pharmacy was most manifest, and the kinship of English-speaking people as well.

To the President and Council and membership I have to convey the fraternal greetings of President Druce and his supporters, the assembled members of the British Conference, with their best wishes for a most successful meeting at St. Louis. A great many of the members of the Conference have been in the United States upon one occasion or another, and a number spoke of making visits again. Dr. Attfield said it was his desire see more of America than in the brief journeys he had already made there. Mr. N. H. Martin, who has twice visited the States, said he certainly expected to come again, and he sent personal regards to his friends in the American Association, names always identified with its interests. I had seen a good deal of Mr. Martin in the Glasgow meeting of the Society of Chemical Industry in the week just before that of the Dublin meeting, and to him as well as to Dr. Attfield I desire to make acknowledgment for continuous kindness. It was very pleasant to see again Dr. Frederick B. Power, who read papers at the meeting.

The subject matter of the papers and discussions at Dublin, as you will have seen by its published reports, was largely concerned with the British Pharmacopœia, and therein of present interest to American pharmacy, in this year of the beginning of the Revision of Nineteen Hundred. I need not say that the loss of Dr. Charles Rice to the work upon the Pharmacopœias is very deeply felt on this side of the Atlantic. It is the loss of the world, and so it is regarded in England.

The British Conference, in membership a smaller body than the American Association, is one of admirable working spirit, devoted almost wholly to questions of practical pharmacy with the technical scientific work therein inherent. Mr. G. C. Druce, at present the mayor of the city of Oxford, has been some years in the chair as president of the Conference, and his annual re-election is a usual matter. The senior General Secretary, Mr. W. A. H. Naylor, of London, after many years of service in this office, declined re-election, and was released with most grateful appreciation. Throughout the meeting, the Conference was entertained with princely hospitality by the officers of the Lord Mayor and the city of Dublin.

Having already referred to the meeting of the Society of Chemical Industry at Glasgow, where the International Exhibition is just now drawing a good many people, I will add that among those known to American pharmacists whom I met there, were the authors Alfred H. Allen and J. Lewkowitsch. Thomas Tyrer, of London, was one of those present at both meetings. The president of the Society for the Glasgow meeting, the successor of Prof. Chandler, of New York, was Mr. Joseph W. Swan, of London, a man whom it is a privilege to remember.

In London, I have lingered again at the headquarters of the Pharmaceutical Society of Great Britain. Here are the journal, the school, the library, and the rooms of the examinations. I find the same lecture-room where I heard lectures of Professor Redwood. Here in Bloomsbury Square they speak of the same problems that are subject matter at home, but speak more hopefully at present. In this brief report I must not enter upon any account at all of pharmacy in Europe. I hope to see for myself a little more of it before sailing home on September the tenth.

I cannot, however, refrain from mention of the Davy-Faraday Laboratory of Research, with which the names of a number of pharmaceutical workers have already been associated. Here *any competent person* can obtain the best possible appliances for investigation, next door to the great library of the Royal Society, with benefit of counsel. All honor to Ludwig Monde, whose endowment of half a million dollars has wisely placed this foundation. It speaks to me of what might well be done for the benefit of pharmaceutical research in the United States. I cannot help believing that some one or more can be found to make such an investment.

Again let me speak of my regret in losing this year's meeting, under the presidency of Mr. Patton, and let me give my wishes for the best of all the meetings, with a prosperous year in every Section and every office of the Association.

ALBERT B. PRESCOTT.

Llandudno, North Wales, August 9, 1901.

Also a postal card received from Dr. Fred. Hoffmann, honorary member of the Association, as follows:

LOHME, ISLAND OF RÜGEN, *August 26, 1901.*

Chas. Caspari, Jr., Secy. Amer. Pharm. Assoc.:

Dear Friend: I beg to thank you for again favoring me with the announcement of the 49th annual meeting of the A. Ph. A. The Association has my best wishes for a pleasant, dignified and successful meeting at St. Louis.

If God spares us health and life, we hope to make it possible to attend next year's semi-centenial meeting of the Association in Philadelphia.

Kindly express my own and Mrs. Hoffmann's assurance of our affectionate remembrance to all good friends gathered at St. Louis who have retained us in their memory.

With kindest regards, yours faithfully, FRED. HOFFMANN.

Applause greeted this message from across the seas.

The Secretary also read a telegram of congratulation and greeting from T. Roberts Baker, of Richmond.

On motion of Mr. Lowe, seconded by Mr. Thompson, it was ordered that the above communications be received and referred for publication.

The chair suggested that it would be a thoughtful and proper thing to do to send a telegram of congratulation to Mr. DuPuy to-morrow, upon the occasion of his eighty-fourth birthday, and upon motion of Mr. Lowe, seconded by Mr. Stedem, it was ordered that the Secretary send such a telegram.

The Chair announced that the next order of business was the call for reports from the standing and special committees, and the Secretary made the call as follows:

Committee on Transportation—Chas. Caspari, Jr., Chairman.

Committee on Revision U. S. Pharmacopœia—Leo Eliel, Chairman.

Committee on General Prizes—Charles T. George, Chairman.

Committee on National Legislation—A. E. Ebert, Chairman.

Committee on National Formulary—C. Lewis Diehl, Chairman.

Committee on Simultaneous Meeting of American Pharmaceutical Ass'n and Nat'l Ass'n of Retail Druggists—Henry P. Hynson, Chairman.

Committee on Membership (Auxiliary)—H. M. Whelpley, Chairman.

Committee on Weights and Measures—F. G. Ryan, Chairman.

Committee on Status of Pharmacists in U. S. Army and Navy—Geo. F. Payne, Chairman.

Committee on Future Welfare of the Association—Jos. P. Remington, Chairman.

Delegates to Section on Materia Medica, Pharmacy and Therapeutics of the American Medical Association for 1900—A. B. Lyons, Chairman.

Delegates to Section on Materia Medica, Pharmacy and Therapeutics of the American Medical Association for 1901—F. J. Wulling, Chairman.

Delegates to National Wholesale Druggists Association—A. E. Ebert, Chairman.

Delegates to National Association of Retail Druggists—Wm. A. Hall, Chairman.

Delegates to National Pure Food and Drug Congress—Lewis C. Hopp, Chairman.

The Chair announced the presence of Mr. W. C. Anderson, of Brooklyn, President of the National Association of Retail Druggists, and invited the gentleman to address the Association.

Mr. Anderson spoke as follows:

Mr. President and Members of the American Pharmaceutical Association:

To represent the National Association of Retail Druggists before this body would be a pleasure at any time, or in any place; but that pleasure is increased to-day when I am reminded that it is within a very few days of the anniversary of the organization of the National Association of Retail Druggists in this city three years ago. The scene I now look upon is unlike the one it was my privilege to witness on the 17th of October, 1898, when representative pharmacists from all sections of the country gathered here and, with a firm determination to do everything in their power for the cause of pharmacy and pharmacists, launched the National Association of Retail Druggists upon its mission. The same intense interest in the welfare of our profession and its members that is demonstrated by this grand gathering of this old and honorable organization was demonstrated at the formation of the organization I have the honor to represent. Nearly fifty years of active work and continued success proves conclusively the value and importance of the American Pharmaceutical Association. The respect shown it at all times, and the anxiety with which pharmacists look for the report of its proceedings, prove without a doubt the high position that it occupies in the pharmaceutical world. The difficult questions with which the National Association of Retail Druggists has attempted to cope, and the short time it has for active work, places it in a position where, to-day, it can only hope that it will eventually attain the grand success that your organization has attained. But its activity, the justness of its cause and the possibilities of success have appealed so strongly to the retail trade of this country that, after an existence of less than three years, I am able to-day to extend to you through it the greetings of 250 affiliated associations, representing nearly thirty thousand retail druggists of this country. [Applause.]

We congratulate the American Pharmaceutical Association upon its long and honorable history. We congratulate the pharmacists of this country that they have had at their disposal in every effort the object of which was the betterment of pharmacy, the active services of the valuable American Pharmaceutical Association. We congratulate ourselves

that we have had before us such a bright example of the value of organization, and the power of concerted and consistent action—and from the very beginning of our organization, I might say, the good will and support of the American Pharmaceutical Association. The objects of our organizations, while they differ in some respects, aim at one grand conclusion—the betterment of pharmacy; and the condition of the retail drug trade to-day is such that scientific and commercial pharmacy are inseparable. One depends to a great extent upon the other, for to pursue a purely scientific course without proper attention to commercial interests will, as a rule, result as unsatisfactorily as pursuing a commercial course without due regard for scientific attainments. The tendency to low commercial tactics is diminished by high scientific attainments, while on the other hand satisfactory commercial conditions always stimulate scientific advancement. The necessity for and value of both the American Pharmaceutical Association and the National Association of Retail Druggists is therefore apparent, and I am enthused with the bright prospects for pharmacy when I look into the faces of these pioneers of pharmaceutical organization and picture the National Association of Retail Druggists looking up to the American Pharmaceutical Association for hope and counsel, and this older organization in turn leaning toward and gaining strength from the younger, while each, following the course mapped out by its policy, with renewed earnestness and vigor, and gradually drawing closer and closer together, goes on toward its goal, until scientific pharmacy is elevated to that high standard to which we aspire and commercial pharmacy is surely established —until that time when these two organizations, standing shoulder to shoulder, shall form the firm foundation on which is built that magnificent structure, American Pharmacy. [Great applause.]

THE PRESIDENT: I will ask whether Mr. Edward W. Case or Mr. G. W. Hunter is here to represent the Ontario College of Pharmacy, and if so we would be glad to hear from them.

Mr. Case responded to the call and said:

Mr. President and Gentlemen of the American Pharmaceutical Association:

In the name and on behalf of the thousand pharmacists of the Province of Ontario I desire to express to you our sincere thanks for your invitation to attend the forty-ninth annual meeting of the American Pharmaceutical Association. And I hope I may be permitted to say that I have a personal interest in attending this gathering, because of the relationship of family ties which unites me with feelings of brotherhood to the American people, for on the paternal side I am descended from stock which owed allegiance to the Empire State, while on the maternal side I am descended from one of those loyalist families which, about the time of the Revolutionary War, left the American Colonies and settled in the wildernesses of Canada. In me is thus united the blood of the United States and Canada.

Now I want to say of the Ontario College of Pharmacy that it is an institution of which we are all justly proud. We are entirely out of debt, and have buildings and an equipment that cost $65,000. Our classes which opened in September numbered 140 students. Our standard of matriculation is recognized as second to that of no institution on this side of the water. It is the same as that of the Toronto University, which is *the* university of the Province.

It was a pleasure, indeed, to listen to the letter read from Prof. Prescott upon the meetings at Glasgow and Dublin. It makes us feel that the ties that bind us together as one people of the Anglo-Saxon race are bound to advance the general good. With the coming of the new century we lost our noble Queen Victoria, and America tendered its heartfelt sympathy. Now we reciprocate to you with all the earnestness of our natures our loving sympathy in the loss of your noble President, who has just fallen by the

assassin's bullet. These trials bring us closer together and make us feel the brotherhood of man.

Let me say in conclusion, Mr. President and gentlemen, that I thank you for your courtesy, and wish for the Association all the prosperity and success which an institution of such long standing and including so many able minds deserves. [Applause.]

THE PRESIDENT: We are glad to have this representative from the Ontario College of Pharmacy with us, and I desire in the name of the Association to extend to him, and his brothers who may be with him, the courtesies of the floor, and hope they will feel free to participate in our deliberations.

Mr. Kennedy, Secretary of the Council, at request of the Chair, now read the minutes of the first session of the Council at St. Louis as follows:

FOURTH SESSION OF THE COUNCIL—SEPTEMBER 16, 1901.

A quorum of the Council having assembled, the Chairman, W. S. Thompson, called the meeting to order at 10 o'clock a. m., in the ladies' parlor of the Southern Hotel, Saint Louis, Mo., with the following members present: Messrs. Beal, Caspari, Diehl, Dohme, Eliel, Good, Kennedy, Lowe, Oldberg, Patton, Sheppard and Whelpley.

The Secretary of Council presented the following items of business, which had come before the Council since last meeting and had been disposed of by correspondence:

BALTIMORE, *May 28, 1900.*

To the Council of the American Pharmaceutical Association:

Your Committee on Finance would lay before the Council the following Budget of Expenditures for the fiscal year of July 1st, 1900–1901, for consideration and approval:

Salaries	$2,800 00
Proceedings	2,500 00
Printing and Stationery	350 00
Miscellaneous Expenses	200 00
General Prizes	200 00
Traveling Expenses	160 00
Stenographer	150 00
Badges and Bars	50 00
Journals for Reporter on Progress of Pharmacy	50 00
Section on Scientific Papers	30 00
Section on Education and Legislation	30 00
Section on Commercial Interests	25 00
Section on Practical Pharmacy and Dispensing	25 00
Committee on Transportation	30 00
Committee on Membership	25 00
Insurance	20 00
Premium on Treasurer's Bond	12 50
	$6,657 50

(Appropriation last year, $7275.00.)

CHARLES E. DOHME,
H. P. HYNSON,
CHAS. A. RAPELYE.

Please send your vote on the above Budget of Expenditures to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Hopp, Hynson, Gayle,

Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson, Whelpley and Whitney—21.

Nays—0.

Conditional—Good—1.

Not voting—0.

The motion was adopted.

POTTSVILLE, PA., *August 30, 1900.*

MR. HENRY P. HYNSON, *Baltimore, Md.*

My Dear Sir: Although not connected any longer, practically, with the noble profession of Pharmacy, I still maintain a lively interest for its advancement, and have particularly noticed with much satisfaction the inauguration and progress of the important work heretofore of the Committee, and now of the "Section of Practical Pharmacy and Dispensing," and believe it should have all the encouragement possible. If in regard to this you should conceive it would promote your purpose and stimulate your members to greater activity, I gladly offer this Section the sum of fifty dollars annually to be distributed as a prize upon such conditions as the members of your Section may deem most advisable.

The offer is made, of course, subject to its acceptance by the Council of the American Pharmaceutical Association.

With kind regards and best wishes for the success of your Section, I am,

Yours faithfully, ENNO SANDER.

Dear Sir: It is moved by Henry P. Hynson, and seconded by George W. Kennedy, that the above offer be accepted with the thanks of the Council.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Good, Gayle, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson, Whelpley and Whitney—21.

Nays—0.

Not voting—Hopp—1.

The motion was adopted.

POTTSVILLE, PA., *November 19, 1900.*

Dear Sir: The Council having been directed by vote of the Association to fix the date of the forty-ninth annual meeting, it is moved by H. M. Whelpley and seconded by Chas. Caspari, Jr., that said meeting be held at St. Louis, Mo., September 16th–21st, inclusive.

Please send your vote to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson and Whelpley—21.

Nays—0.

Not voting—Whitney—1.

The motion was adopted.

POTTSVILLE, PA., *April 2, 1901.*

Dear Sir: The following request has been received by the Chairman of Council, Wm. S. Thompson, and in compliance with his instructions is hereby submitted to the members for a vote:

WILLIAM S. THOMPSON, *Washington, D. C.*

Dear Sir: I wish to obtain permission to reprint a whole or part of the epitome of the National Formulary in the appendix of a book I am preparing on practical medicine for circulation among physicians.

I wish to re-classify the N. F. formulas according to therapeutic uses, and shall probably add some introductory matter. Used in connection with our journal, the book will doubtless have a large circulation, and I hope may popularize the use of the N. F. preparations.

Sincerely yours, S. A. BURDICK.

Please send your vote to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Baker, Beal, Caspari, Eliel, Gayle, Good, Hynson, Kennedy, Lowe, Oldberg, Patton, Ruddiman, Sheppard, Thompson, Whelpley, Whitney—16.

Nays—Dohme, Rapelye—2.

Conditional—Prescott—1.

Not voting—Alpers, Diehl, Hopp—3.

The motion was adopted.

POTTSVILLE, PA., *April 27, 1901.*

Dear Sir: It is moved by S. A. D. Sheppard, and seconded by Chas. Caspari, Jr., that a committee be appointed to take into consideration the future welfare of the Association, and report at the meeting of the Council in St. Louis, this committee to consist of the five gentlemen who acted on a similar committee at the Richmond meeting, together with the President of the Association and the chairman of the Finance Committee.

The committee will be composed of the following named gentlemen: Remington, Thompson, Whelpley, Alpers, Ebert, Patton and Dohme.

Please send your vote on the above motion to the undersigned.

GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Gayle, Good, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson, Whelpley, Whitney—19.

Nays—0.

Not voting—Eliel, Hopp, Hynson—3.

The motion was adopted.

POTTSVILLE, PA., *May 7, 1901.*

Dear Sir: It is moved by H. P. Hynson and seconded by George W. Kennedy that Treasurer Sheppard and General Secretary Caspari be added as *ex-officio* members of the committee just appointed, "to take into consideration the future welfare of the Association."

Please send your vote on the above motion to the undersigned.

Yours respectfully, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Diehl, Dohme, Eliel, Gayle, Good, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Thompson, Whelpley and Whitney—19.

Nays—Caspari—1.

Not Voting—Hopp, Sheppard—2.

The motion was adopted.

POTTSVILLE, PA., *May 9, 1901.*

Dear Sir: It is moved by S. A. D. Sheppard and seconded by W. S. Thompson that

Thomas Layton, of St. Louis, Mo., be added as the third member of the Committee to arrange for the exhibition at St. Louis.

The members of the committee will then be J. P. Remington, H. M. Whelpley and Thomas Layton.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Hynson, Kennedy, Oldberg, Patton, Prescott, Ruddiman, Sheppard, Thompson and Whelpley—18.

Nays—0.

Not Voting—Caspari, Lowe, Rapelye and Whitney—4.

The motion was adopted.

POTTSVILLE, PA., *May 16, 1901.*

Dear Sir: In view of the fact that the holding of an exhibition in connection with the next annual meeting was approved by the Association at Richmond, Va., May 17th, 1900, it is moved by Chas. Caspari, Jr., and seconded by S. A. D. Sheppard, that in the arrangement of the 1901 programme sufficient time be set aside for an official visit to the Exhibition, and to allow the exhibitors to appear before the Association for the purpose of better explaining the character of their exhibits, also that the sum of fifty dollars ($50.00) be and the same is hereby appropriated for the expenses of the Committee on Exhibition.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson and Whelpley—19.

Nays—0.

Not Voting—Hynson and Whitney—2.

The motion was adopted.

POTTSVILLE, PA., *May 25, 1901.*

Dear Sir: Prof. J. O. Schlotterbeck desiring to have two full-page engravings appear in the next volume of proceedings in connection with two papers which he will present at the St. Louis meeting, it is moved by Chas. Caspari, Jr., and seconded by W. S. Thompson, that the Publication Committee be authorized to contribute the sum of forty dollars ($40.00) (being about one-half the cost) towards the expense of said engravings.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Sheppard, Thompson, Whelpley and Whitney—21.

Nays—0.

Not Voting—Ruddiman.

The motion was adopted.

POTTSVILLE, PA., *June 6, 1901.*

Dear Sir: It is moved by Charles E. Dohme, and seconded by H. P. Hynson, that the Treasurer be authorized to transfer the sum of fifty dollars ($50.00) from the unexpended balance of the sum appropriated for printing and stationery to the account of miscellaneous expenses.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Sheppard, Thompson, Whelpley and Whitney—21.

Nays—0.

Not Voting—Ruddiman—1.

The motion was adopted.

BALTIMORE, MD., *June 4, 1901.*

To the Council of the American Pharmaceutical Association:

Your Finance Committee presents the following budget of expenditures for the fiscal year 1901–1902, which after consultation with the Secretary and Treasurer, has been found adequate to meet our expenses for the coming year:

Salaries	$2,800 00
Proceedings	2,500 00
Miscellaneous Expenses	300 00
Printing Expenses	250 00
General Prizes	200 00
Traveling Expenses	200 00
Stenographer	150 00
Badges and Bars	80 00
Journals for Reporter on the Progress of Pharmacy	50 00
Section on Scientific Papers	30 00
Section on Education and Legislation	30 00
Section on Commercial Interests	25 00
Section on Practical Pharmacy and Dispensing	25 00
Committee on Transportation	30 00
Committee on Membership	25 00
Insurance	20 00
Premium on Treasurer's Bond	12 50
	$6,727 50

CHARLES E. DOHME, *Chairman,*
CHAS. A. RAPELYE,
H. P. HYNSON.

Please send your vote on the adoption of the above budget to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hynson, Kennedy, Lowe, Oldberg, Patton, Prescott, Rapelye, Ruddiman, Sheppard, Thompson, Whelpley and Whitney—21.

Nays—0.

Not Voting—Hopp—1.

The motion was adopted.

POTTSVILLE, PA., *July 8, 1901.*

Dear Sir: The Council voted fifty dollars ($50.00) for the expenses of the Committee on Exhibition. The bills presented by the Committee exceed the appropriation by two dollars and seventy cents ($2.70). Chas. Caspari, Jr., moves the bills be paid as presented and W. S. Thompson seconds the motion.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hynson, Kennedy, Oldberg, Patton, Rapelye, Sheppard, Thompson and Whelpley—17.

Nays—0.

Not Voting—Hopp, Lowe, Prescott, Ruddiman and Whitney—5.

The motion was adopted.

POTTSVILLE, PA., *July 20, 1901.*

Dear Sir: It is moved by H. M. Whelpley and seconded by James M. Good that the following program for the forty-ninth annual meeting, proposed by the General Secretary, the Local Secretary and the Secretary of the Council, be adopted:

Monday, September 16th.

10.00 a. m. Council Meeting.
3.00 p. m. First General Session.

Tuesday, September 17th.

10.00 a. m. Second General Session.
3.00 p. m. Meeting of Commercial Section.

Wednesday, September 18th.

10.00 a. m. Third General Session devoted to Discussion of Exhibits.

Thursday, September 19th.

10.00 a. m. Meeting of Section on Practical Pharmacy and Dispensing.
3.00 p. m. Meeting of Scientific Section.
8.00 p. m. Meeting of Scientific Section.

Friday, September 20th.

10.00 a. m. Meeting of Scientific Section.
3.00 p. m. Meeting of Section on Education and Legislation.
8.00 p. m. Meeting of Section on Education and Legislation.

Saturday, September 21st.

10.00 a. m. Last General Session.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hynson, Kennedy, Lowe, Oldberg, Patton, Rapelye, Ruddiman, Sheppard, Thompson and Whitney—19.

Nays—0.

Not voting—Hopp, Prescott, Whelpley—3.

The motion was adopted.

POTTSVILLE, PA., *July 23, 1901.*

Dear Sir: It is moved by Chas. Caspari, Jr., and seconded by H. M. Whelpley, that the General Secretary be authorized to have made twenty-five (25) gold badges, and also fifty (50) gold bars for the St. Louis meeting.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Alpers, Baker, Beal, Caspari, Diehl, Dohme, Eliel, Gayle, Good, Hynson, Kennedy, Oldberg, Patton, Ruddiman, Rapelye, Sheppard, Thompson, Whelpley and Whitney—19.

Nays—0.

Not voting—Hopp, Lowe and Prescott—3.

The motion was adopted.

POTTSVILLE, PA., *August 10, 1901.*

MR. W. S. THOMPSON, *Chairman of the Council, A. Ph. A, Washington D. C.:*

Dear Sir: Last year the Committee on Transportation distributed fifty thousand

envelope slips among the wholesale houses in various parts of the country. These firms mailed the slips without expense to the Association to the pharmacists throughout the United States, calling their attention to the next meeting.

It is difficult to trace the direct results coming from such work. In addition to the immediate returns it brings the Association to the notice of the pharmacists of the country, and is a form of legitimate advertising which I believe the A. Ph. A. needs and can well afford to do.

Therefore, I move that the Chairman of the Committee on Transportation be instructed to have fifty thousand envelope slips printed and distributed among the wholesale houses. These will reach the pharmacists of the country just prior to the St. Louis meeting, and no doubt influence favorably some of those undecided about making the trip. Very truly, H. M. WHELPLEY.

Seconded by J. M. Good.

Please send your vote on the above motion to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of the Council.*

Yeas—Baker, Beal, Diehl, Dohme, Eliel, Gayle, Good, Hopp, Hynson, Kennedy, Lowe, Oldberg, Patton, Rapelye, Ruddiman, Thompson and Whelpley—17.

Nays—Alpers—1.

Not voting—Caspari, Prescott, Sheppard and Whitney—4.

The motion was adopted.

Chairman Thompson appointed Messrs Searby of California, Ebert of Illinois and Miller of Virginia, a Committee on Credentials, with directions to report direct to the Association.

S. A. D. Sheppard moved, seconded by Oscar Oldberg, that the dues of N. Gray Bartlett of Chicago, W. P. DeForest of Brooklyn and Theo. H. Patterson of Chicago, be remitted and their names be placed on the list of life members, old style, without the Proceedings. The motion was adopted.

Geo. W. Kennedy presented the names of 101 applicants for membership, which on motion of C. L. Diehl, duly seconded, were recommended to the Association.

C. B. Lowe moved, seconded by G. W. Kennedy, that the Association meet in General Session on Thursday morning, at 10 o'clock, for the purpose of taking suitable action in regard to the death of the President of the United States, and further, that a committee be previously appointed to present suitable resolutions on the above occasion. It was also moved and seconded by the same parties that the first session of the Section on Scientific Papers be deferred until 8 o'clock p. m. on Thursday and the session of the Section on Practical Pharmacy and Dispensing until 3 o'clock p. m. of the same day. Both motions were adopted.

Chas. Caspari, Jr., read the following report of the Committee on Publication, which was on motion of G. W. Kennedy received and adopted.

REPORT OF THE COMMITTEE ON PUBLICATION.

Mr. Chairman and Members of the Council of the American Pharmaceutical Association:

Your Committee on Publication beg leave to report that the Proceedings of the forty-eighth annual meeting have been published and a copy of the same delivered in December, 1900, and since that time to every member entitled thereto according to the Treasurer's accounts, besides the usual number (100) of complimentary copies to our honorary members, State libraries, the pharmaceutical press, educational institutions and foreign scientific bodies. The delay in the issue of the Proceedings was due to the fact that the Reporter on the Progress of Pharmacy was directed at the last meeting to embrace in his report all publications issued up to July 1, 1900, some of which from abroad

did not reach his hands until the latter part of the month. Fourteen hundred copies of the book were printed, of which 200 remain on hand in flat sheets; 1,135 copies have been bound in cloth and 65 copies in paper. It was found necessary during the past year to bind in cloth 25 copies of the 1898 volume of Proceedings and 70 copies of the 1899 volume, the stock having become exhausted. The cost of publication and delivery is shown by the following items:

Composition, paper and presswork (1,400 copies)		$1,768 74
Binding 1,135 copies in cloth @ 23 cts.	$261 05	
" 70 " " @ 23 cts.	16 10	
" 25 " " @ 24 cts.	6 00	
" 65 copies in paper @ 8 cts.	5 20	
		288 35
Expressage and postage: Expressage (cloth 26, paper 23); Postage (cloth 28, paper 25)		342 39
Illustrations		41 96
Journals for the Reporter		43 94
Salary of the Stenographer		150 00
Salary of the Reporter on Progress of Pharmacy		750 00
		$3,385 38

CHAS. CASPARI, JR., *Chairman.*

Chas. Caspari, Jr., presented a communication from Prof. J. P. Remington relative to the application of Prof. F. Jadin, of Montpelier, France, for appointment as corresponding member of the Association, which, on motion of O. Oldberg, was laid upon the table.

Oscar Oldberg moved, seconded by Jas. H. Beal, that a special committee of three be appointed, of which the President and General Secretary of the Association shall be members, to consider the advisability of electing corresponding members in various parts of the world, and that said committee shall report at the next annual meeting, together with such nominations as they may have to make. This motion was adopted.

It was moved by Chas. E. Dohme, and seconded by Jas. H. Beal, that the General Rules of Finance be amended by adding to Rule 13 the following: "Provided, however, that the Treasurer shall be authorized to transfer from one account to another, such amount as may be needed at any time, the amount of any such transfer not to exceed the sum of fifty (50) dollars." The motion was adopted.

Chas. E. Dohme moved, seconded by Jas. H. Beal, that a new rule, to be known as No. 15, be added to the General Rules of Finance and to read as follows: "All balances remaining from appropriations at the close of each fiscal year shall be turned back into the treasury, unless otherwise ordered by the Council." This motion was adopted.

Chas. Caspari, Jr., asked that permission be granted the General Secretary to have an additional number of gold badges and gold bars made, request for same having been made by the Local Secretary. On motion of G. W. Kennedy, duly seconded, the General Secretary was authorized to have as many badges and bars made as he may think necessary.

G. W. Kennedy presented and read the report of the Committee on Membership, which on motion of Leo Eliel was accepted and referred to the Association.

The reports of the Treasurer and General Secretary were presented. On motion the reading of the reports was dispensed with and they were referred to the Association at large.

S. A. D. Sheppard moved, seconded by G. W. Kennedy, that the action of Council of April 26, 1900, to sell bonds of the General Fund and place the proceeds in the Life Membership Fund, be rescinded. This motion was adopted.

On motion of C. L. Diehl it was agreed that the Council hold daily sessions at 9.30 a. m.

The Council, on motion of G. W. Kennedy, adjourned.

GEO. W. KENNEDY, *Secretary.*

The chair announced that, without objection, the minutes of the Council would stand approved as read, and it was so ordered.

Mr. Kennedy also read a list of 101 names of applicants for membership, stating that 45 of them were from the city of St. Louis, the announcement being greeted with applause. The list was ordered to take the usual course, and be posted for inspection.

MR. THOMPSON: Mr. President, the Council has recommended that the Association take steps for the proper observance of the death of the President of the United States by the appointment of a committee to frame appropriate resolutions to be presented at a session of the Association to consider them and take action, and I move that we take action on that suggestion. The action of the Council did not state how that should be done, I believe, and I move that the President of the Association appoint a committee of five to draft these resolutions.

Mr. Dohme seconded the motion of Mr. Thompson, and it was unanimously adopted.

The Chair announced that the Secretary had some communications he would read now.

THE SECRETARY: These communications were overlooked when I read the others, and I have no doubt they will be very welcome to the Association. You will perhaps recall that the Secretary was directed last year to have special copies printed of the memorial on Prof. Procter by Mr. Remington, to be sent to the family of Prof Procter. This was done, and I received a letter of acknowledgment from Mrs. Procter—who is now perhaps seventy-five years of age—and one from Wallace Procter, son of Prof. Procter. I will read them, and would suggest that they be published in the Proceedings.

MR. C. CASPARI, JR.:

Dear Friend: I thank you very much for the package received yesterday, containing four copies of Prof. Remington's memorial address, and also for your note by same mail. It is very gratifying to my children and myself that Prof. Procter's worth is being recognized by pharmacists, yet they cannot know, as I do, how his *life* was given to the work! how his *heart* and *soul* were in the work! his own personal interests being as nothing in comparison with those of the Philadelphia College of Pharmacy, and with the advancement of the profession in general, in knowledge and in pure ethics.

Very truly yours,
CATHARINE PROCTER,
(MRS. WM. PROCTER, JR.)

500 S. 9th St., Feb. 15, 1901.

PHILADELPHIA, *February 14, 1901.*

PROF. CHAS. CASPARI, JR., *Gen. Sec. A. Ph. Assoc., Baltimore, Md.:*

My Dear Sir: Your letter together with the copies of the memorial were duly received this morning. I hasten to thank you for them and especially for the kindly expression of the former, both relative to my father and to myself. Knowing so well the spirit in which he labored for the advancement of his chosen profession and the unremitting labors he undertook in its behalf, it is exceedingly gratifying for me to know that after the lapse of a generation, his work is still prominent in the minds both of

those who knew him personally and of those who have profited by his contributions to the fund of pharmaceutical knowledge. Again thanking you for your kind words both for myself and my mother and sister, I am most sincerely yours,

WALLACE PROCTER.

Mr. Remington seconded the motion to publish these letters, and it was so ordered.

The chair appointed as a committee to prepare resolutions upon the death of the President of the United States Messrs. C. B. Lowe, of Philadelphia; Oscar Oldberg, of Chicago; J. H. Beal, of Ohio; J. W. T. Knox, of Detroit, and Adolph Brandenberger, of Missouri.

The chair announced that the time for the selection of a Nominating Committee had arrived, and the Secretary would call the roll of the States, Territories and Provinces. He called attention to the fact that while each State and Province was entitled to representation on the committee, it would be necessary for delegates present who were not members of the Association to complete their membership before being eligible.

Mr. Thompson moved that all those whose names were read by Mr. Kennedy as applicants for membership be now admitted as members of the Association and eligible as representatives on the Nominating Committee by signing the Constitution and paying their dues.

The motion was seconded by Mr. Mayo and carried.

The chair declared a recess of five minutes, to give the delegates from the States and Provinces an opportunity to decide upon their representatives upon the committee.

Upon resumption the Secretary called the roll of the States, Territories and Provinces, and the Nominating Committee was made up as follows:

Arkansas—Jno. B. Bond, Wm. L. Dewoody.
California—Wm. M. Searby.
Connecticut—Chas. A. Rapelye.
District of Columbia—Wm. S. Thompson.
Georgia—Geo. F. Payne.
Illinois—Paul G. Schuh, Theo. C. Loehr.
Indiana—F. W. Meissner, Theo. E. Otto.
Iowa—Fletcher Howard, E. M. Burns.
Kansas—L. E. Sayre, F. E. Holliday.
Kentucky—W. H. Averill, J. W. Gayle.
Louisiana—Max Samson.
Maryland—Chas. E. Dohme, Chas. Caspari, Jr.
Massachusetts—W. L. Scoville, S. A. D. Sheppard.
Michigan—F. G. Ryan, A. B. Lyons.
Minnesota — Miss Wanous, A. C. LeRicheux.
Mississippi—W. P. Craig.
Missouri — Francis Hemm, Wm. Mittelbach.
New Jersey—E. A. Sayre, Chas. Holzhauer.
New York—R. G. Eccles, C. A. Mayo.
Ohio—Jas. H. Beal, Chas. G. Merrell.
Oklahoma—F. B. Lillie.
Pennsylvania—C. B. Lowe, J. A. Koch.
Texas—E. G. Eberle.
Virginia—F. A. Miller.
Province of Ontario—Ed. W. Case, J. F. Roberts.

The Chair stated that it was the duty and privilege of the President to name five members-at-large on the Nominating Committee, and he would name Messrs. Enno Sander, of St. Louis; Jos. P. Remington, of Philadelphia; Adolph Brandenberger, of Missouri; J. W. T. Knox, of Detroit, and Geo. W. Sloan, of Indianapolis.

The Chair announced that, although it was understood the Association would meet in Philadelphia in 1902, it would be better to formally ratify that selection, and he would appoint on the Committee on Time and Place of Next Meeting, Messrs. W. S. Thompson, of Washington City; Chas. E. Dohme, of Baltimore; Caswell A. Mayo, of New York; W. L. Dewoody, of Arkansas, and George C. Bartells, of Illinois.

Upon motion of Mr. Remington, it was ordered that the Nominating Committee meet immediately upon the adjournment of this session.

THE SECRETARY: A number of communications have been placed in my hands in regard to time and place of meeting in 1903, and it might be well to place them in the hands of the Committee with the view of having them outline something for that year.

MR. REMINGTON: I move that all communications with regard to future time and place of meeting be referred to this Committee just appointed, to be reported on at a later session. I want to give my friend Dewoody something to do.

The motion was seconded by Mr. Dohme, and carried.

The Chair announced that all business properly coming up at this session had now been transacted, and a motion to adjourn would be in order.

Mr. Meissner made the motion, and the Association thereupon adjourned until to-morrow (Tuesday) morning, at 10 o'clock.

SECOND SESSION—TUESDAY MORNING, SEPT. 17, 1901.

The second General Session of the Association was called to order by President Patton in the main parlor of the hotel (where all succeeding sessions were held) at 10:30 a. m.

The Secretary read the minutes of the first session, which, upon motion of Mr. Sheppard, were adopted as read.

The Chair called for the report of the Nominating Committee, which was read by the Secretary as follows:

REPORT OF THE NOMINATING COMMITTEE.

The Committee on Nominations beg leave to recommend the following names of members selected as desirable candidates for election as officers of the Association and members of the Council for the ensuing year:

For President—Henry M. Whelpley, of St. Louis, Mo.

For First Vice-President—Wm. M. Searby, of San Francisco, Cal.

For Second Vice-President—Geo. F. Payne, of Atlanta, Ga.

For Third Vice-President—Wm. S. Thompson, of Washington, D. C.

For Treasurer—S. A. D. Sheppard, of Boston, Mass.

For General Secretary—Chas. Caspari, Jr., of Baltimore, Md.

For Reporter on the Progress of Pharmacy—C. Lewis Diehl, of Louisville, Ky.

For Members of the Council—Chas. A. Rapelye, of Hartford, Conn.; Jas. H. Beal, of Scio, O.; C. B. Lowe, of Philadelphia, Pa.

WM. S. THOMPSON, *Chairman.*

CHAS. CASPARI, JR., *Secretary.*

Mr. Searby moved that the Secretary be directed to cast the affirmative ballot of the Association for the whole list of nominees, but Mr. Ebert explained that it was customary to elect the President by separate ballot, and Mr. Searby accepted the amendment. The motion, as amended, was seconded by Mr. Lyons and adopted.

The Secretary accordingly cast the ballot of the Association for Henry M. Whelpley, of St. Louis, as President of the Association for the ensuing year, and the Chair declared him duly elected. [Great applause.]

Mr. Sloan moved that the Secretary of Council be now directed to cast the ballot of the Association for the remaining nominees of the committee, and the motion was adopted unanimously.

Mr. Kennedy announced that he had obeyed instructions and cast the vote of the Association as follows:

First Vice-President—W. M. Searby, San Francisco, Cal.

Second Vice-President—Geo. F. Payne, Atlanta, Ga.

Third Vice-President—W. S. Thompson, Washington, D. C.

Treasurer—S. A. D. Sheppard, Boston, Mass.

General Secretary—Chas. Caspari, Jr., Baltimore, Md.

Reporter on Progress of Pharmacy—C. Lewis Diehl, Louisville, Ky.

Council—J. H. Beal, Scio, Ohio; C. B. Lowe, Philadelphia, Pa.; Chas. A. Rapelye, Hartford, Conn.

The Chair accordingly declared these gentlemen duly elected to the offices designated. [Applause.]

Mr. Caspari offered the following resolution, which was seconded by Mr. Dohme and unanimously adopted:

It is moved that at the next annual meeting of this Association in 1902, a special jubilee session be held to commemorate the fiftieth anniversary of its organization, and that Dr. Frederick Hoffmann, of Berlin, Germany, be invited to preside over this session and to deliver the address of the occasion.

Mr. Remington: Mr. President, there is a matter I would like to bring before the Association at this time, and I want to reach the ear of every member present. At this meeting an innovation has been introduced, in the making of an exhibition of pharmaceutical products. While a good many of the members know about this exhibition, some of them may not, and it is desirable that every member present should be alive to the fact that we have prepared such an exhibit. The Committee on Welfare of the Association believe such exhibitions will have a large influence in the future upon the best interests of the Association. We want every member of this Association to take an interest in the exhibition down-stairs. A number of firms have gone to considerable expense and labor to prepare for you something that will interest you and something that will benefit you. I know that, oftentimes, a man feels about an exhibition, "Oh, we have that with us always," and that it is not necessary to visit it; but the principle upon which this is conducted is of vital interest to this Association. Mr. Thomas P. Cook, of New York, has thrown himself heartily into the work and given his time to it, and I feel that his work, particularly on this occasion, should be recognized by you, and that you should visit the exhibition and take an interest in it, and be present here on Wednesday morning to hear what the representatives of the exhibitors in three-minute

speeches have to say about these exhibits. We are introducing a novel idea, and have excluded objectionable things, and at the same time have promised to give to these firms an opportunity to be heard in a short talk. Don't forget to come to this meeting and hear what these men have to say, and encourage this feature as much as you possibly can. [Applause.]

MR. HYNSON: I have a little scheme, also, to present to the Association, Mr. President, and I especially appeal to the retail druggists in the matter. I want them to consider the *baby* section of the Association—the Section on Practical Pharmacy and Dispensing, which meets on Thursday. I want you to be on hand and take part in the discussions. You retail pharmacists are bigger men than you think you are, and I especially appeal to you. On the table here you will find an abstract of the report of the committee of last year, and a compilation of the prescriptions received by the committee last year. I want you to study these, and be ready to discuss them when the matter comes up as you only can. Don't think the college professors can "down you" in this work, because you know more about it than they do. [Laughter.] I particularly want the St. Louis druggists to take these prescriptions home with them and experiment with them, and when the time comes I want you to be on hand and speak out your sentiments. [Applause.]

Mr. Kennedy read the minutes of the second session of the Council at St. Louis as follows:

FIFTH SESSION OF THE COUNCIL—SEPTEMBER 17, 1901.

In the absence of the Chairman, on motion of Chas. Caspari, Jr., C. Lewis Diehl was called to preside, with the following members present: Messrs. Caspari, Eliel, Kennedy, Patton and Rapelye.

G. W. Kennedy presented the names of 21 applicants for membership, which on motion were directed to take the usual course.

Chas. A. Rapelye, Chairman of the Auditing Committee, submitted the following report, which on motion was accepted and the committee discharged.

HARTFORD, CONN., *July 24, 1901.*

To the Chairman of the Council of the American Pharmaceutical Association:

Sir: The undersigned Committee appointed to audit the books of the Treasurer, General Secretary and Chairman of the Council report that they have examined and compared the books, accounts and vouchers of the said several officers, that they have compared and checked all items of receipt and expenditure, have examined and counted the bonds and certificates representing the invested funds of the Association, and have also checked the bank books for the sums deposited during the period covered from April 1, 1900 to July 1, 1900, and from July 1, 1900 to July 1, 1901. We further report that the books and accounts of the several officers are carefully and accurately kept, and that all disbursements have been properly made and are attested by properly executed vouchers, and that we find all funds of the Association carefully recorded and accounted for.

Respectfully submitted,

CHAS. A. RAPELYE,
PHILO W. NEWTON.

On motion, the Council adjourned.

GEO. W. KENNEDY, *Secretary.*

The Chair stated that, without objection, the Minutes of the Council would be adopted as read, and it was so ordered.

Mr. Kennedy read an additional list of 21 applicants for membership, making a total of 122 to this time.

MR. KENNEDY: It is very gratifying to me to say—and I know it will be very pleasant to the members of the Association to hear it—that of this total of 122 applicants to date, 106 have already paid their annual dues, and one has paid his life-membership dues of $75. [Applause.]

The Chair announced that the list would take the usual course.

The Treasurer's report was called for as being now in order, and Mr. Sheppard read the report as follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1900 TO JULY 1, 1901.

RECEIPTS.

Cash on hand July 1, 1900		$1,758 80
Received from sale of 3 Certificates @ $5.00		15 00
Received from sale of 2 Duplicate Certificates @ $2.50		5 00
Received from sale of Proceedings		71 89
Received from sale of Badges and Bars		3 50
Received from sale of National Formulary		539 74
Received from Interest on Deposit in New England Trust Co., Boston		33 91
Received from Interest on Money Invested in Bonds (General Fund)		160 00
Received from Interest on Life Membership Fund		440 00
Received from sale of one Bond (General Fund)		1,000 00
Received from Interest on same		12 56
Received from Annual Dues, 1898	$65 00	
Received from Annual Dues, 1899	235 00	
Received from Annual Dues, 1900	1,820 00	
Received from Annual Dnes, 1901	2,270 00	
Received from Annual Dues, 1902	20 00	
		4,410 00
Received from Life Membership Fees, viz.—		
Charles T. George	$30 00	
Samuel L. Rumsey	35 00	
George Leis	20 00	
John W. Ballard	20 00	
Lemuel I. Morris	40 00	
		145 00
Total		$8,595 40

DISBURSEMENTS.

1900				
July	4.	Check 840, J. W. Whelpley, Treasurer, Miscellaneous		$12 50
		Check 841, John S. Bridges & Co.—		
		National Formulary	$28 73	
		Printing and Stationery	24 72	
		Committee on Membership	7 21	
		Committee on Practical Pharmacy	3 22	
		Section on Commercial Interests	4 34	
		Section on Scientific Papers	3 18	
				71 40
	27.	Check 842, Mills and Knight Co., Printing and Stationery		9 25
		Check 843, Wickersham Printing Co., National Formulary		21 25

July	30.	Check 844, Wickersham Printing Co.—		
		Proceedings	$31 59	
		Insurance	5 50	
		National Formulary	48 85	
		Miscellaneous	29 10	
				115 04
August	14.	Check 845, C. Lewis Diehl, National Formulary		50 00
	22.	Check 846. Charles Caspari, Jr.—		
		National Formulary	$8 47	
		Printing and stationery	2 10	
		Proceedings	10 67	
		Miscellaneous	19 59	
				40 83
September	11.	Check 847. John S. Bridges & Co.—		
		Printing and stationery	$4 75	
		Section on Education and Legislation	5 16	
				9 91
	17.	Check 848. Alpha Photo-Engraving Company, Proceedings.		38 75
	21.	Check 849. Wickersham Printing Company—		
		National Formulary	$47 27	
		Proceedings	11 50	
		Section on Education and Legislation	2 00	
		Miscellaneous	1 50	
				62 27
	27.	Check 850. J. W. Whelpley, Treasurer, Miscellaneous		12 50
November	6.	Check 851. American Security and Trust Company, Miscellaneous		5 00
	9.	Check 852. John S. Bridges & Co., Printing and Stationery.		23 50
December	17.	Check 853. John S. Bridges & Co., Printing and Stationery.		4 50
	17.	Check 854. S. A. D. Sheppard, first half year's salary as Treasurer, 1900–1901		375 00
	17.	Check 855. George W. Kennedy, first half year's salary as Secretary of Committee on Membership, 1900–1901	$75 00	
		First half year's salary as Secretary of Council, 1900–1901	75 00	
				150 00
	17.	Check 856. C. Lewis Diehl, first half year's salary as Reporter on Progress of Pharmacy, 1900–1901.		375 00
	17.	Check 857. Charles Caspari, Jr., first half year's salary as General Secretary, 1900–1901.		500 00
	26.	Check 858. J. W. Whelpley, Treasurer, Miscellaneous		12 50
	27.	Check 859. Wickersham Printing Company—		
		National Formulary	$37 95	
		Miscellaneous	2 00	
				39 95
1901.				
January	17.	Check 860. John S. Bridges & Co., Printing and Stationery.		1 50
	17.	Check 861. Wickersham Printing Company—		
		Proceedings	$1,768 74	
		Miscellaneous	37 80	
				1,806 54

February	5.	Check 862. Wickersham Printing Company—		
		Section on Commercial Interests	$4 50	
		Section on Scientific Papers	5 50	
		Section on Practical Pharmacy and Dispensing	20 00	
				30 00
	5.	Check 863. Chronicle Publishing Company, Printing and Stationery		8 75
	5.	Check 864. Albert E. Ebert, Miscellaneous		6 75
	15.	Check 865. Wickersham Printing Company—		
		Proceedings	$506 06	
		National Formulary	7 49	
		Miscellaneous	21 71	
				535 26
	26.	Check 866. S. A. D. Sheppard & Co., Miscellaneous		22 90
	26.	Check 867. Wickersham Printing Company—		
		National Formulary	$46 15	
		Printing and Stationery	8 50	
				54 65
	26.	Check 868. American Security and Trust Company, Promissory Note and Interest		1,007 78
March	1.	Check 869. American Bonding and Trust Company, Premium on Treasurer's Bond		12 50
	16.	Check 870. Wickersham Printing Company—		
		Proceedings	$29 00	
		National Formulary	5 75	
				34 75
	16.	Check 871. William H. Bradford, Printing & Stationery		61 75
April	16.	Check 872. Wickersham Printing Company—		
		Proceedings	$26 98	
		National Formulary	3 02	
		Miscellaneous	13 97	
				43 97
May	31.	Check 873. Chronicle Publishing Company, Printing and Stationery		22 00
	31.	Check 874. Charles Caspari, Jr.—		
		Proceedings	$14 90	
		National Formulary	10 57	
		Journals	43 94	
		Insurance	10 00	
		Miscellaneous	13 22	
				92 63
June	17.	Check 875. C. Lewis Diehl, second half-year's salary as Reporter on Progress of Pharmacy, 1900–1901		375 00
	17.	Check 876. George W. Kennedy, second half-year's salary as Secretary of Committee on Membership, 1900–1901	$75 00	
		Second half-year's salary as Secretary of Council, 1900–1901	75 00	
				150 00
	17.	Check 877. S. A. D. Sheppard, second half-year's salary as Treasurer, 1900–1901		375 00
	17.	Chas. Caspari, Jr., second half-year's salary as General Secretary, 1900–1901		500 00
				$7070 88

1900.				
September	6.	Life Membership Fund, Charles T. George	$30 00	
1901.				
March	18.	Life Membership Fund, Samuel L. Rumsey	35 00	
April	17.	Life Membership Fund, George Leis	20 00	
May	7.	Life Membership Fund, John W. Ballard	20 00	
June	21.	Life Membership Fund, Lemuel I. Morris	40 00	
				145 00

SUMMARY OF DISBURSEMENTS JULY 1, 1901, TO JULY 1, 1902.

Proceedings	$2,438 19
Journals for the Reporter on Progress of Pharmacy	43 94
Salaries for the year 1900–1901	2,800 00
Premium on Treasurer's Bond	12 50
Section on Scientific Papers	8 68
Section on Education and Legislation	7 16
Section on Commercial Interests	8 84
Section on Practical Pharmacy	23 22
Committee on Membership	7 21
Printing and Stationery	171 32
Insurance	15 50
Miscellaneous Expenses	211 04
Amount paid for Current Expenses	$5,747 60
Life Membership Fund	145 00
National Formulary	315 50
Promissory note and Interest	1,007 78
Total amount of Disbursements	$7,215 88
Cash on hand, July 1, 1901	1,379 52
Total	$8,595 40

APPROPRIATIONS AND EXPENDITURES UNDER SAME, FOR THE FISCAL YEAR JULY 1, 1900, TO JULY 1, 1901.

	Appropriations.	Expenditures.
Salaries	$2,800 00	$2,800 00
Proceedings	2,500 00	2,438 19
Printing and Stationery	300 00	171 32
Miscellaneous Expenses	250 00	211 04
General Prizes	200 00	
Traveling Expenses	160 00	
Stenographer	150 00	
Badges and Bars	50 00	
Journals for Reporter on Progress of Pharmacy	50 00	43 94
Section on Scientific Papers	30 00	8 68
Section on Education and Legislation	30 00	7 16
Section on Commercial Interests	25 00	8 84
Section on Practical Pharmacy and Dispensing	25 00	23 22
Committee on Transportation	30 00	
Committee on Membership	25 00	7 21
Insurance	20 00	15 50
Premium on Treasurer's Bond	12 50	12 50
Unexpended Balance		909 90
	$6,657 50	$6,657 50

On account of the unusual date at which last year's meeting was held, it was necessary that the amounts due for General Prizes, Traveling Expenses, Stenographer, Badges and Bars, and Committee on Transportation should be paid before the commencement of the present fiscal year. These payments are in the Treasurer's Supplementary Report for April 1, 1900, to July 1, 1900. See 1900 Proceedings, pages 862 and 863.

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, and also from members whose residence is unknown, there is now outstanding on the books of the Association:

Annual dues for 1900	$460 00
Annual dues for 1901	2,390 00
	$2,850 00

Respectfully submitted,
S. A. D. SHEPPARD, *Treasurer.*

Boston, July 1, 1901.

HARTFORD, CONN., *July 23, 1901.*

The undersigned Auditing Committee of the A. Ph. A. report that they have examined the books, accounts and vouchers of the Treasurer from April to July, 1900, and also from July, 1900, to July, 1901, and find the same correct, and that all funds of the Association passing through his hands have been properly accounted for.

CHAS. A. RAPELYE,
PHILO W. NEWTON.

On motion of Mr. Hinrichs, it was ordered that the Treasurer's report be received and accepted.

The Chair called for the report of the Secretary, which Mr. Caspari presented as follows:

REPORT OF FINANCIAL ACCOUNTS IN THE CARE OF THE GENERAL SECRETARY.

A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF NATIONAL FORMULARY, FROM JULY 1, 1900, TO JUNE 30, 1901.

I. Receipts.

From Sales and Payment of Bills due July 1, 1900		$539 74

II. Expenses.

Printing and mailing 10,000 circulars in connection with Physicians' Epitome, N. F.	$28 73	
Imprinting cover of Physicians' Epitome, N. F.	11 55	
Binding 3,500 copies Physicians' Epitome @ 4¼ cts.	148 75	
" 300 " National Formulary in cloth @ 11 cts.	33 00	
" 24 " " " " int. @ 18 cts.	4 32	
" 25 " " " in sheep @ 23 cts.	5 75	
Honorarium paid Prof. Diehl for preparation of the Physicians' Epitome, N. F.	50 00	
Postage and Expressage (National Formulary)	24 93	
" " (Epitome)	8 47	
		315 50

III. Remittances.

To Treasurer, as per Treasurer's Receipts	539 74

IV. Sales.

To dealers and individuals, as per ledger accounts		577 59

V. Accounts Unpaid.

By dealers		87 25

VI. Bills Due by the Association.

All bills due have been paid.

VII. Stock on Hand.

Copies in flat sheets (unbound)	540	
Copies bound in cloth	25	
Copies bound in cloth, interleaved	17	
Copies bound in sheep	8	
Copies bound in sheep, interleaved	4	
		594

B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF NATIONAL FORMULARY SINCE 1888.

Receipts to June 30, 1900 (see Proc., Vol. 48, p. 864)	$11,614 40	
Receipts from July 1, 1900, to June 30, 1901	539 74	
		$12,154 14
Expenses to June 30, 1900 (see Proc., Vol. 48, p. 864)	$7,030 41	
Expenses from July 1, 1900, to June 30, 1901	315 50	
		7,345 91
Total Receipts from Sale of Physicians' Epitome of National Formulary from June 1, 1900, to June 30, 1901		314 28
Total Expenses on Account of Physicians' Epitome from June 1, 1900, to June 30, 1901		534 30

C. SALE OF PROCEEDINGS.

Receipts from July 1, 1900, to July 30, 1901	$71 89	
Remitted to Treasurer, as per Treasurer's Receipts		71 89

D. ACCOUNT OF BADGES AND BARS.

On hand July 1, 1900 (see Proc., Vol. 48, p. 865): Badges	13	
Bars	67	
Badges sold from July 1, 1900, to June 30, 1901, 1, @ $2.00	$2 00	
Bars sold from July 1, 1900, to June 30, 1901, 1, @ 75 cts.	75	
		$2 75
Remitted to Treasurer, as per Treasurer's Receipts		2 75
Balance on hand July 1, 1901: Badges	12	
Bars	66	
Receipts from Sale of Badges and Bars to June 30, 1900 (see Proc., Vol. 48, p. 865)	$821 60	
Receipts from July 1, 1900, to June 30, 1901	2 75	
		824 35
Total cost of Badges and Bars to June 30, 1900		775 35

CHAS. CASPARI, JR., *General Secretary.*

Baltimore, July 1, 1901.

THE PRESIDENT: Gentlemen, you have heard the report of your Secretary. What is your pleasure?

MR. STEDEM: I move that it follow the usual course—be accepted and referred for publication.

And it was so ordered.

The report of the Committee on Credentials was called for, and Mr. Searby presented the report as follows:

REPORT OF COMMITTEE ON CREDENTIALS.

The Committee on Credentials beg to report that they have examined the credentials presented by delegates of the various organizations named below and find them correct:

Colleges of Pharmacy—California, Chicago, Cleveland, Louisville, Maryland, Massachusetts, National, New York, Ontario, Philadelphia and Saint Louis—11.

Schools of Pharmacy—Medico-Chirurgical College of Philadelphia; Purdue University of Lafayette, Ind.; University College of Medicine of Richmond, Va.; University of Iowa; University of Michigan and University of Minnesota—6.

State Pharmaceutical Associations—Arkansas, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Oklahoma, Ohio, Pennsylvania, Texas and Vermont—23.

Alumni Associations of Colleges of Pharmacy—Philadelphia—1.

National Associations—National Association of Retail Druggists—1.

Local Associations—German Apothecaries' Society of the City of New York, Kings County Pharmaceutical Society, Manhattan Pharmaceutical Association and Philadelphia Association of Retail Druggists—4.

WM. M. SEARBY, *Chairman*,
ALBERT E. EBERT,
T. A. MILLER.

Mr. Hinrichs moved to adopt. Carried.

THE PRESIDENT: I desire to say to these delegates that we welcome them to our meeting, and on behalf of the Association I beg further to say that they are accorded the privileges of the floor and are invited to take part in our discussions.

At request of the Chair, Mr. Kennedy read the report of the Committee on Membership as follows:

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

Gentlemen: In compliance with the requirements of the By-Laws of our Association, it affords to me great pleasure to submit to you my 27th annual report of the Committee on Membership, and furthermore do I appreciate the fact that my health and strength have been spared during all these years to be able to submit the reports to you in person. As usual, immediately after the adjournment of the 48th annual meeting, held at Richmond, Va, last year, your Secretary gave the duties of his office prompt attention by mailing the customary invitation to become a member to each applicant who was accepted and invited by the Association to complete his membership. At the last meeting, one hundred and twenty-five persons were proposed as proper persons to become members of our Association, and of this number, one hundred and two, or nearly eighty-two per cent., accepted the invitation and completed their membership, and their names have been placed on the roll of members. So far as known, our new members are men of high standing in their profession, honored and respected by all their acquaintances, men of high integrity and honest principles, and who will not only take an interest in the

Association, but will aid and facilitate the purposes of its organization. The new members are credited to twenty-eight states, Indian Territory, District of Columbia and Canada.

Last year, the Committee on Transportation sent out fifty thousand envelope slips and distributed them among the wholesale houses of the country, they having volunteered o send them out to the pharmacists throughout the United States, calling their attention to the annual meeting of the Association. There is reason to believe that this step met with favorable results, bringing many good men into the Association and increasing the attendance at the last annual meeting. This year a similar move was made in that direction by action of Council, and it is to be hoped that a larger number of the good pharmacists throughout the country may become identified with our Association.

Great credit is due the Chairman of the Committee on Membership, H. M. Whelpley, for his untiring efforts since the last meeting to procure desirable members. Your Secretary, in compliance with instructions from the Chairman, mailed blank applications to different active members of the Association throughout the United States, urging them to interest the pharmacists in their vicinity in the Association's work.

Up to the present writing, a large number of applications have been received and the present indications are that the number of new members to be proposed will greatly exceed that of the past several years.

The Treasurer, S. A. D. Sheppard, reported to your Secretary that there were, on August 20, 1901, ninety-one members liable to be dropped from the roll for the non-payment of dues. It is to be regretted that in this age of civilization and learning, when persons in every walk in life are uniting themselves together to better adapt themselves to meet future contingencies, the number to be dropped for the non-payment of dues continues to be so large. It can scarcely be believed that they lack the proper interest in the Association that it deserves, but it is to be hoped that it is merely due to oversight on the part of the delinquents and that a number will pay up before their names are stricken from the roll.

Since our last meeting, ninety-eight members have been dropped from the roll for non-payment of dues. It is hard to realize that so large a number have not appreciated the benefits and advantages of being a member of our Association. Setting all aside save a careful perusal of the annual proceedings, which contain, among other things, all the latest pharmaceutical discoveries from year to year of special interest to every scientific and learned pharmacist, this alone more than amply repays one for the slight remuneration which the Association asks of its members.

Report on Membership.

Active and contributing members in good standing at last report	1,155	
Members elected since last report	102	
Total		1,257

Loss in Membership (active).

By resignation	23	
By transfer to life membership	5	
By death	18	
Dropped from the roll for various reasons	98	
Total		144
Number on roll at this report		1,113

Life Membership.

Number on roll at last report	108	
Number added since last report	5	
Total	113	

Loss in Life Membership.

By death	4	
Number on the roll at this report		109

Honorary Membership.

Number on roll at last report	12	
Additions	0	
Total	12	
Loss by death	1	
Number on the roll at this report		11

Total Membership.

Active or contributing members	1,113
Life members	109
Honorary members	11
Total	1,233

Another year has passed, and during that time many of our number have again left our ranks to join that solemn procession in its march to the grave. The spirit, weary of its suit of clay, has departed to join, in the great beyond, with those who were their sublunary associates. As they, fatigued in body and mind, welcomed the evening at the close of day, so likewise, after lives of perseverance and usefulness, they have welcomed the evening of life. Their life has been one of sacrifice, privation, bodily discomfort and shattered nerves. But a time comes to all men "to suffer and be silent." Silent though they now be, they have left behind them monuments more changeless than brass and more durable than marble, which bespeak their devotion to their profession and their good works to mankind.

Among the number of our deceased associates reported to me are found the names of Edward R. Squibb and Charles Rice, two of the greatest benefactors of the human race that ever lived, and whose loss, not only to our Association but to the world, is irreparable. Within six months of each other, the Angel of Peace closed their weary eyes, and the hopes, fears and ambitions which stirred their hearts during life forever ceased. Time only will cause the world to fully comprehend their work for the great benefit of humanity. Their good deeds will long outlive their names.

While we glory over the lives of these two men as shining lights of the profession, yet we must not forget that during the lives of all our deceased brothers, they labored untiringly to cause their profession to be lifted to the topmost pinnacle of honor and respect. It was the love of the profession more than pecuniary reward that inspired their hearts and crowned their lives with success. To them business was not the whole absorbing thing that occupied their minds. Possessed of a genial disposition, generous impulses and high social qualities, together with thoroughness and method in matters of business, it cannot be said of any one of them that their lives were objectless and in vain, and that, since death has claimed them for its victims, they will languish in obscurity and oblivion.

The following is a lists of deceased members brought to the attention of your Secretary:

Arnold, Charles F., Sioux City, Iowa.
Blatchford, Eben, Rockport, Mass.
Burgess, Wm. G., Newport News, Va.
Cameron, Donald L., Rutherford, N. J.
Cotton, W. H., Newport, R. I.
Eger, George, Cincinnati, Ohio.
Eggers, Fred H., Allegheny, Pa.
Girling, Robert N., Detroit, Mich.
Louis, Leopold G., Jamaica, L. I.
Maisch, Henry C. C., Philadelphia, Pa.
May, Eugene, New Orleans, La.
Oberdeener, Samuel, Santa Clara, Cal.

Pfingst, Ferdinand J., Louisville, Ky.
Preston, David, Philadelphia, Pa.
Quayle, Thomas A., New Orleans, La.
Reynolds, Richard, Leeds, Scotland.
Rice, Charles, New York, N. Y.
Scherff, Jno. P., Bloomfield, N. J.
Squibb, Edward R., Brooklyn, N. Y.
Warner, William R., Philadelphia, Pa.
Wilhite, Frank T., Anderson, S. C.
Wilson, Frank M., Willimantic, Conn.
Woodward, Brinton W., Lawrence, Kan.

Charles F. Arnold, of Sioux City, Iowa, one of the most prominent pharmacists in that city, died at his home, 615 Jones Street, on January 31st, 1901, aged 48 years. Mr. Arnold was a member of the firm of Scherling & Arnold, who had a pharmacy at Fourth and Iowa Streets since 1888. He came to the city in 1878 and entered the employ of O. A. Patterson, long since retired from business, as a clerk. His genial disposition and courteous manners won to him a great number of friends. He was graduated in 1883 from the Philadelphia College of Pharmacy, and in 1888 entered into partnership with Gus. Scherling, a classmate of his, and together they opened up one of the largest drug stores in Sioux City. His death was a suddon shock to the entire community. The deceased was a kind-hearted man, was very charitable and gave liberally to the poor. He leaves a widow but no children to mourn his loss. Deceased became a member of our Association in 1891, at the meeting held in New Orleans, Louisiana.

Eben Blatchford, of Rockport, Mass., died at his home in that city on March 6th, 1896, aged seventy-four years, of grippe. At an early age he entered upon the study of pharmacy, and pursued his course with such diligence and skill, that when quite a young man he was recognized as one of the leading pharmacists of the country. He was a man of fine presence and magnetic manners, and made friends wherever he went without an effort. In public affairs he took a deep interest, and always stood for the best government. He never made himself obnoxious but was always found lined up for good government. For nearly half a century, Mr. Blatchford manifested a deep interest in his chosen profession, seeking always to find a method or joining in some good cause which would tend to elevate it and cause it to be respected throughout the country. Shortly after the organization of the American Pharmaceutical Association, he became a member of that body, and at the time of his death bore the proud distinction of being one of its oldest members. The esteem in which he was held by those who were associated with him in his professional career bears testimony to the manly beauty of his nature, and the loss that American pharmacy has sustained by his death is almost irreparable. Deceased became a life member of our Association in 1857, at the meeting held in Philadelphia, Pa.

William G. Burgess, of Newport News, Va., one of the best known and most popular business men in Virginia, died at his home at the corner of Washington Avenue and Twenty-fifth Street after a brief illness on March 31, 1901. Mr. Burgess was thirty-three years of age, having been born in November, 1867, at Morganton, N. C. At an early age he studied pharmacy and spent the greater part of his life in the drug business. In Virginia, prior to coming to Newport News, he lived in Danville, Petersburg, Manchester and Hampton. In December of 1895, he came to Newport News, buying out with a partner the Hopkins drug store at the corner of Washington Avenue and 26th street, which he named the Warwick Pharmacy. He soon built up a prosperous business, and afterwards bought out the interest of his partner, owning the entire business at the time of his death. The unexpected death of Mr. Burgess was a great shock to that city. He was a particularly lovable man, companionable, magnetic. He was known to almost every one and liked by all. As a man his good heart was his guide, his charity was limited only by his resources. He was ready at all times to give his time and his substance to the needy. An appeal was never made to him in vain. His purse was always open.

A cry of distress touched his heart and brought quick and generous response. In all the years he was in business as a pharmacist, no one ever came to him for medicine and left without it, whether the customer had money or not. It was this trait and his ready sympathy that endeared him so much to his friends and to all who came in contact with him. His sympathy was boundless. The troubles of his friends he made his own, and their joys were as dear to him as to themselves.

He was public-spirited to a remarkable degree. His interest in all public matters was all but proverbial and it took a substantial form. He contributed to the extent of his means to public enterprises. He took a prominent part in all public movements and was a leader in most of them. Though engrossed in his private business, he always found time to do his whole duty as a citizen. As a business man, success came to him spontaneously, naturally, almost unsought. He was the kind of a man success courted and crowned. Business aside, he was a cultured, attractive, splendid gentleman, and association with him was a pleasure understood only by those who had the advantage of being thrown in his company. He was an active member of the Business Men's Association, the Newport News Retail Druggists' Association, and the Virginia Pharmaceutical Association. Mr. Burgess leaves a sister and a fourteen-year-old nephew to survive him. Deceased became a member of our Association in 1898, at the meeting held at Baltimore, Md.

Donald L. Cameron, of Rutherford, N. J., died at his home in that city on August 11th, 1900, after a congestive chill due to the very warm weather. Mr. Cameron was born July 18th, 1848, at Cork, of Scottish parents, who were temporarily in Ireland; he was brought by his parents to this country when an infant. When quite young he manifested a decided liking for chemistry, to which branch of science he applied himself very diligently. When only fifteen years of age he began his apprenticeship in the drug business, and after clerking for J. N. Hegeman, of New York city, and C. H. Boswell, of Brooklyn, at the age of twenty-seven he went into business for himself at 155 Grand street, Brooklyn. He remained at this stand for about four years, after which he was at Marcy avenue and Hewes street for about seven years, and then at Reid avenue and Hancock street for about nine years. He gave up the retail business about 1895 or 1896, shortly after going to East Orange, N. J., where he had charge of three departments of Seabury & Johnson's laboratory. His love for the dispensing business, however, proved too strong to be ignored, and after two years in the manufacturing line he bought an interest in the store of F. W. McGee at Rutherford, and remained as a member of the firm of Cameron & McGee to the time of his death. In 1888 he was elected a member of the Kings County Board of Pharmacy, continuing in office until his removal from the State, when he resigned. For a number of years he was President of the Board. He was highly esteemed, and even dearly beloved, by all the legitimate druggists in the county. He was a practical man of good common sense, and had decided ideas as to how a candidate should be examined. If the candidate was a good druggist Mr. Cameron could usually find it out, whether he was quick at answering theoretical questions or not. In 1894 Mr. Cameron was elected Second Vice President of the New York State Pharmaceutical Association, and at the time of his death was the First Vice President of the New Jersey Association. He was married to Miss Rachel Antoinette Hopkins, of Brooklyn, who survives him. Deceased became a member of our Association in 1897, at the meeting held at Lake Minnetonka, Minn.

William H. Cotton, of Newport, R. I., died at his home on Cotton's Court July 25th, 1900, in the 64th year of his age. Mr. Cotton had been in poor health for some months. In the early spring he had an attack of the grippe, which led to pneumonia, and from which he never fully recovered, although his death was caused by a complication of diseases. Mr. Cotton was born in Plymouth, Mass., in 1847, but his parents moved to this

city when he was very young. His father was Dr. Charles Cotton, one of the most distinguished physicians of his day in Newport. His father was a graduate of Harvard College in the class of 1808. The deceased was a grandson of the late Captain Stephen T. Northum, once a well known merchant ship owner and sea captain in Newport. Mr. Cotton succeeded his father in the drug business, in which he made a great success. He was of a genial and kindly disposition, which made him friends everywhere. For years he was a member of the State Board of Pharmacy, and was several times President of the Rhode Island Pharmaceutical Society. Mr. Cotton was a generous man, giving whenever he thought it was needed, and many a poor person will long remember with feelings of gladness his kindly and timely aid. Mr. Cotton was married in 1871 to Elizabeth, daughter of the late George Borden Hazard, and she and her two chidren survive him. He also leaves five grandchildren. His son recently was graduated with honors at the Fales Art School at Boston, and is to complete his education in his chosen art in Paris. Deceased became a member of our Association in 1885, at the meeting held in Pittsburg, Pa.

George Eger, of Cincinnati, Ohio, died in his home in that city recently. He was born on August 7, 1836, and was educated in Rottweil, Ellwangen and Ehingen. Entered the drug business as an apprentice in Esslingen, Germany, and after apprenticeship clerked in Stuttgart, Germany, and Geneva, Switzerland. Came to America in 1855, locating in Madison, Ind. From there he went to Terre Haute, Ind., and then went to St. Louis, Mo., after which he returned to Europe and attended a term in the University of Tubingen; then returned to Covington, Ky., where he married. In 1863 he located in Cincinnati, on Central avenue, near Mohawk Bridge. Mr. Eger has more than once been elected President of the Cincinnati College of Pharmacy, and since its organization has been a continuous devotee to its interests. He has often contributed thereto from his private resources and helped the institution when assistance was of vital importance. He served every year as a member of the Lecture Committee, the Examination Committee, or as a Trustee, for the past twenty-five years. Mr. Eger was a prominent member of the Ohio State Pharmaceutical Association, serving in many capacities for the welfare of the Ohio druggists, taking active interest in establishing and maintaining the Ohio pharmacy law.

Deceased became a member of our Association in 1864, at Cincinnati, Ohio, and from that time up to the time of his death contributed his full share of support in advancing American pharmacy. Mr. Eger was a conspicuous example of many apothecaries who like their calling not only because of material returns, but also on account of the unselfish devotion they bear to a cause they love.

Fred. H. Eggers, of Allegheny, Pa., died at his home in that city at 641 East Ohio street, after a lengthy illness. Heart disease, superinduced by excessive heat, caused his death. Mr. Eggers was one of the best known druggists of Western Pennsylvania. He was born in Allegheny November 17th, 1831, and served his apprenticeship with Dr. A. J. Zwinger, one of the most prominent of the early druggists of Pittsburg. In company with his son, Frederic W. Eggers, he conducted several pharmacies in the cities of Allegheny and Pittsburg. He was also connected with a number of financial institutions. As a business man, he knew his business from beginning to end. He was alert, progressive, enterprising, abreast of the times. His genius for making friends, his genial way, his courtesy and personal magnetism, enabled him to win where others lost. Besides being an excellent business man, he was very charitably disposed, and was at all times ready to alleviate the sufferings of others, and many a sad heart was made glad by his imely contributions. He labored unceasingly to raise the standard of pharmacy, not only in the State of Pennsylvania in which he was particularly interested, but throughout the United States. He served for a number of years on the State Pharmaceutical Examining Board of Pennsylvania. He was the father of eight children, all of whom with his

widow survive him. Deceased became a member of our Association in 1872, at the meeting held in Cleveland, Ohio.

Robert N. Girling, of Detroit, Mich., died at his home in that city, in March, 1899. Of his early life we have no immediate knowledge, but it is known that he came from England, and has practiced pharmacy in several of the cities of the Union, coming from New Orleans in August, 1898, at which time he purchased the drug business of Howard J. Linsell, at 436 Grand River Avenue, which business he conducted up to the time of his death. During his entire life he displayed a great interest in his chosen profession, and directed all his energy toward elevating it to the highest standard. In all his business dealings, he was honest, truthful and sincere, cautious at all times of the qualities of medicine he dispensed. Through his courteous and genial manners, he made friends on all sides, and became very popular with all with whom he came in contract, but his untimely death shortly after engaging in business in Detroit cut short what promised to be a very successful business life. Two children, a son and a daughter, mourn his loss. Deceased became a member of our Association in 1876, at the meeting held in Philadelphia, Pa.

Leopold G. Louis, of Jamaica, L. I., New York, died in his home in that place on May 25th, 1900, of paralysis. Deceased was born in Alabama on September 30th, 1837, and spent thirty-four years of his life in the naval service of the United States, retiring September 21st, 1899. He was a man of good education and well adapted to pursue a professional life. He was an earnest worker in the interest of pharmacy and was a frequent contributor to measures advancing the interests of pharmacy. The zeal displayed by Mr. Louis to raise the standard of pharmacy in the Navy, a fact since accomplished, will never be forgotten by those in the Naval service at the present time, or who may enter it in the capacity of a pharmacist in the future. He was a man of broad views, always tolerant of the views of others, and generous to a fault. He was always kind and courteous and highly respected by the entire Naval Department. A great portion of his time was spent in the Marine Barracks and the Naval Hospital Dispensary in New York. He leaves a widow and one daughter to mourn his loss. Deceased became a member of our Association in 1897, at the meeting held at Lake Minnetonka, Minnesota.

Henry C. C. Maisch, Doctor of Philosophy, formerly a professor in several medical colleges, died after a short illness of appendicitis at his home, 2869 Poplar street, Philadelphia, Pa., July 1, 1901, at the age of thirty-six years. He was born in Brooklyn, and was a son of the late Professor John M. Maisch, for many years a member of the faculty of the Philadelphia College of Pharmacy, and one of the editors of the National Dispensatory. This work the son continued after the parent's death about eight years ago. Henry Maisch was graduated from the Philadelphia College of Pharmacy in 1885 with a degree of Ph. G., and after pursuing his studies further at Goettingen University, Germany, was awarded the degree of Ph. D. by that venerable seat of learning in 1889. Upon returning to this country, he was for a time an assistant professor at Clark University, Worcester, Mass., going thence to a professorship in the Illinois College of Pharmacy at Chicago. For a short time, he was a clerk to a Louisville druggist, and, when he finally returned to Philadelphia to make that city his home, he engaged in the retail drug business for himself at 10th and Ogden streets. For two years he was Professor of Materia Medica and Botany at the Medico-Chirurgical College at Philadelphia, but resigned that post last year. For nearly three years past after giving up his drug store, he was connected with the chemical laboratories of Hance Bros. & White, which position he held up to the time of his death. Much of Mr. Maisch's work has been of a highly important and practical nature, and has done much for the raising of the standards of drugs in commerce. A widow and one son survive him. He was a

prominent member of the Columbia Turnverein, the Northwestern Medical Society, the Deutscher Verein and other organizations. Deceased became a member of our Association in 1885, at the meeting held at Pittsburg, Pa.

Eugene May, of New Orleans, La., died at his home in that city on June 17th, 1901, the result of injuries received several days previous by being thrown from his horse. Mr. May was born in Daviess county, Ky., near the city of Owensborough, August 23d, 1845. In 1855 his parents moved to New Orleans, where he has since resided. Receiving a public school education, he early exhibited a preference for the study of pharmacy, and the sole idea of his youthful years was to prepare himself for graduation in a pharmaceutical course. As a pupil of the city schools he was denominated a bright student, and his energetic application to school duties gained the approbation of his teachers and all who were in a position to note the ambitious youth's progress in his studies. At an early age Mr. May entered the employ of Wheelock, Finley & Co., wholesale druggists, and during the period he remained with this firm he continued his studies in pharmacy. Stalwart genial and prepossessing in manner, he made and held friends on all sides, and became very popular with all with whom he came in contact. At an early age he began to manifest great interest in local politics, and in 1876 he was elected clerk in the Civil Court for Orleans Parish, and relinquished his position with Wheelock, Finley & Co. He served in this capacity with marked fidelity and great credit until 1879, during which year he was selected as Recorder of Mortgages for the parish. This position he retained until 1883, when he voluntarily gave up a promising political career to go into business for himself. His original ambition was never lost sight of, and having successfully passed his examination he obtained his certificate as a pharmacist and commenced business as a retail druggist at Canal and Chartres streets, in a building he occupied during his entire business career. This afterwards proved to be one of the most popular establishments in the city. The acquirement of wealth did not in even one small particular change the current of his former plain and genial bearing, and no one could be found to envy Mr. May the prosperity he had created. Wealth and honors were liberally showered upon the head of this self-made man, who owed nothing to influence, nothing to capital, and carved his way by sheer merit to a place in the front rank of citizenship of the South. Mr. May was formerly President of the Canal Street Board of Commissioners, and Vice President of the Carrollton Avenue Commission. In private life his home occupied the most sacred corner of his heart. He devoted all possible leisure moments to his family and the social obligations it entailed. He was twice married. His first wife was Miss Victoria Richards, of New Orleans, and his second Miss Mattie Cunningham, of this city. One daughter by his first wife and his widow are left to mourn their loss. In his death the city of New Orleans loses an ideal citizen, and will long mourn his untimely demise. Deceased became a member of our Association in 1891, at the meeting held at New Orleans, La.

Samuel Oberdeener, of Santa Clara, Cal., died at his home in that city on May 21st, 1900, being under forty-two years of age. After receiving a good common school education, he entered on his apprenticeship in one of the best pharmacies in that section of the country, where he displayed great aptness in his studies, and in a short time, owing to his neatness and cleanliness, and being particular with everything he undertook to do, it was soon acknowledged by his employer that he had chosen the proper course of study, and a profession which would bring him a large reward in the future. He continued his studies in the State University and was awarded a gold medal at the time of his graduation from the Department of Pharmacy. He subsequently engaged in the drug business for himself on Franklin street, Santa Clara, which business he conducted up to the time of his death. He expended in a liberal and charitable manner, and gained a reputation for commercial acumen equaled by but few business men in that city.

Aside from business, he displayed a great interest in the welfare of the town, serving for four consecutive terms the office of town trustee. There is yet another aspect of Mr. Oberdeener's life on which one cannot dwell merely because it would have been eminently distasteful to him to have it discussed in print, but we will merely hint that he delighted in doing a good turn for those who needed it. By his death many a poor soul in Santa Clara will miss a good and faithful friend. Deceased became a member of our Association in 1889, at the meeting held in San Francisco, Cal.

Ferdinand J. Pfingst, of Louisville, Ky., died very suddenly at Cassel, Germany, while on a visit to that place. He was a native of Germany, and came to visit a Louisville uncle when a boy, together with his brother. After arriving in Louisville they became enamored of the little village and the country surrounding it, and petitioned their father to allow them to remain there. He was a man of means and asked them what business they desired to engage in. The Louisville uncle, who was a physician, advised them to open a drug store, and theirs was the first drug store worthy of the name opened in Falls City. The Pfingst brothers prospered from the beginning. Soon they branched out and opened other stores, and their business grew with the city. Mr. Pfingst was a druggist in Louisville when cut-rate shops were unknown, and consequently accumulated considerable wealth. In 1890 Mr. Pfingst retired from business. He was then a wealthy man. Possessed of every requisite for the keen enjoyment of life's pleasures, he doubtless looked forward to many years of contented existence; but little did he know then, at the time of his retirement, that he would have so short a time to enjoy the hard-earned profit of a life of labor. He was prominent in pharmaceutical circles, and labored unceasingly for the welfare of the pharmacists throughout the country. Deceased was a life member of our Association, having joined in 1867, at the meeting held in New York City, N. Y.

David Preston, of Philadelphia, Pa., who was a surviving partner of the firm of William Procter, Jr. Co., of 9th and Lombard streets, Philadelphia, died of consumption at his former home in Maryland, on October 22nd, 1900. Mr. Preston was a partner of the late Professor Procter, and assisted him in many of his scientific researches. As a druggist he was highly successful, and by his integrity and learning, commanded the respect and confidence of all the medical profession, in consequence of which he enjoyed a large prescription trade. He did not believe in buying anything he could make, and carried on his business more as a profession than a strictly mercantile affair. He had hosts of friends among the wholesale and retail drug trade, and his death, though not wholly unexpected, was a source of sorrow and grief to all who are aware of his many kindly qualities. His irrepressible vitality and energy soon established a remarkably lucrative business for the firm of which he was a partner, and he stepped almost at once into the front commercial ranks of the city's prosperity. During his life he manifested a great interest in his chosen profession, and labored indefatigably to procure for it the honor and respect to which it was justly entitled. He took considerable interest in various Pharmaceutical Societies. Deceased became a member of our Association in 1868, at the meeting held in Philadelphia, Pa.

Thomas A. Quayle, of New Orleans, La., died at his home in that city on November 16, 1900. Mr. Quayle was born in New Orleans thirty-one years ago. After receiving a good education, he spent the early part of his life in studying medicine and pharmacy. When he was thoroughly versed in this, his chosen profession, he was graduated as an M. D. at Tulane College in 1891. He was awarded his diploma as pharmacist two years later. Subsequently, he was appointed Assistant Instructor in Pharmacy and was afterwards made Professor of Pharmacy in the Tulane Medical Department, the institution from which he had graduated. He was an able teacher and was held in high esteem by his associates. As a disciple of his chosen profession, he was industrious, laborious and

persevering, always endeavoring to promote its interests, and to give his fellow pharmacists a deeper realization of the pleasures of the profession. Mr. Quayle was single. He is mourned by a brother, J. W. Quayle, and two sisters—the one the wife of Dr. J. M. Matter, and the other the wife of Dr. J. R. Adams. Drs. Matter and Adams are prominent New Orleans gentlemen; the former being a druggist and the latter a physician. Deceased was elected a member of our Association in 1897, at the meeting held at Lake Minnetonka, Minnesota.

Richard Reynolds, of Leeds, England, an honorary member of our Association, died at his home at Cliff Lodge, Hyde Park, Leeds, on April 5th, 1900, aged seventy years. Through the death of Mr. Reynolds Leeds has lost one of its most intelligent citizens and the British Empire one of her most cultured pharmacists. As a lad he went from Banbury, in 1844, as an apprentice to Thomas Harvey, Leeds, after which he went for a session to the School of Pharmacy, London, 1850–51, where he took the first prizes in chemistry, materia medica and botany. That was the year in which Mr. T. B. Groves, Mr. Henry T. Watts, Dr. William Squire and others were at the Square. From that time Mr. Reynolds' connection with the Pharmaceutical Society was of the most intimate character, for immediately after his Square year he went for two years to Mr. Henry Deane at Clapham. The Leeds business, to which he returned as partner, was taken over in 1816 by Mr. William West, F. R. S., but previous to that time a Mr. Matterson, who had been employed by Allen & Hanburys, had carried on the business. Mr. West, after twenty-five years' work at 13 Briggate, gave up pharmacy to devote himself exclusively to analytical chemistry, and was one of the founders of the Leeds Philosophical and Literary Society, of which Mr. Reynolds was later so devoted a member. Thomas Harvey then took over the Briggate concern—he had been trained at Southall's in Birmingham—and Mr. Reynolds, after his year at the Square and his two years with Mr. Henry Deane, joined Mr. Harvey as a partner in 1854. The business, under his guidance, was carried on with remarkable success and many developments until 1883, when Mr. Frederick Branson joined him as a partner, and seven years later his son, Mr. Fred Reynolds, was also taken into the partnership, and the firm became a limited company a few years ago. Into Mr. Reynolds' public and social work in Leeds we cannot enter at this time, but it suffices to state that he was one of the town's most honored citizens. His work in pharmaceutical research began when he was at Clapham with an analysis of a specimen of native carbonate of soda, and this was followed at intervals by a number of papers chiefly of chemical subjects, although botany and natural science primarily were especially his delight. For example, it was he who suggested the Pathological Society, which met in Bloomsbury Square in the fifties, with Professor Bentley as the leader, and such men as Henry Deane and Daniel Hanbury as active workers, Richard Reynolds being the Hon. Secretary. With everything that was for the furtherance of pharmacy in the best sense he was identified. He was one of the founders of the Pharmaceutical Conference, and acted as Hon. Secretary, in conjunction with Professor Attfield, from its foundation until 1871; and he acted as President in 1881 when the Conference met at York. He was an examiner to the Pharmaceutical Society in the days when the appointment was unremunerative, and he began what promised to be a distinguished career as a councillor in 1869, but this office he resigned in 1871 on account of a railway accident which severely injured him. He took an active part in opposing the Poisons Regulations in the latter year, and his influence had much to do with the defeat of the compulsory scheme. He renewed his opposition in 1898, but was content to allow a younger generation to judge for themselves, which was the characteristic of the man—broad-minded, liberal, sympathetic he always was, and strongest in force when he knew he was fighting for a good cause, even though it might not be popular. He was the first Chairman of the Chemists' and Druggists' Trade Association of Great Britain, which was

founded in 1876 as a defence association for chemists, who were at that time much harassed by the injudicious proceedings of public analysts. We may also recall the fact that it was he who got the Pharmaceutical Society to see how wrong it was to use methylated spirit for tinctures, with the result that the Board of Inland Revenue stopped the practice. There are many in pharmacy who have lost an excellent friend in Mr. Reynolds. Deceased became an honorary member of our Association in 1882, at the meeting held at Niagara Falls, N. Y.

Charles Rice, of New York, died at his apartments in Bellevue Hospital, on Monday, May 13th last, of cancer of the throat. Dr. Charles Rice was born at Munich, in 1841, of Austrian parentage, the family name being Reis, and which on his arrival in the United States was anglicized into "Rice." He received his education in public and private schools and in the seminaries at Passau, Vienna and Munich. At an early age he had special opportunities for acquiring a knowledge of various languages, and he soon became distinguished for his linguistic ability. This wonderful talent was developed to such a degree that he was able to read in a dozen or more languages—his knowledge of Sanscrit being phenomenal. The death of his parents threw him upon his own resources, and he left his native country, proceeding first to England and afterwards coming to the United States. In 1865, he came to New York, where he entered the service of the Department of Public Charities and Correction at Bellevue Hospital as an assistant to John Frey, who for more than thirty years was the apothecary of that institution and its dependencies. On the decease of the latter, Dr. Rice was appointed his successor, after becoming chemist to the department. In 1867 he became a member of the New York College of Pharmacy, being elected a trustee of that institution in 1870, a position he held for many years. He was a member of a large number of scientific societies all over the world. In 1879, the honorary degree of Doctor of Philosophy was conferred upon him by the University of New York. In 1876 he became associate editor of "New Remedies," which later became the "American Druggist," a position he held until 1891, when he became Reporter on the Progress of Pharmacy for our Association. His report as Chairman of the Committee on Revision of the Pharmacopœia paved the way for his election as Chairman of the Committee of Revision by the Pharmacopœia Convention of 1880. The subsequent conventions of 1890 and 1900 again elected him Chairman, a position he held at the time of his death.

He was a busy man, and having no relatives, spent the latter years of his life in his laboratory and library. In 1890, the Pharmacopœial Convention unanimously voted him an honorarium of one thousand dollars for his services. He returned the check as a donation to the Pharmacopœial fund, holding that it would be unfair to his associates on the committee to accept the money. In the pharmaceutical world, his influence was far-reaching, through his advice and assistance to other people, a labor of love on his part, and for which he never received financial remuneration.

As a member of the New York College of Pharmacy, Mr. Rice took an active part as chairman of the Examination Committee, for many years personally conducting the examinations of candidates for graduation. He was also chairman of the Library Committee, compiling with his own hand the first library catalogue issued by the college. In later years he had often expressed the wish to withdraw from this committee in favor of some younger man, but his colleagues would not grant his request. Mr. Rice was the recipient of many honors. In addition to those already named, he was a corresponding member of the Societe d'Anvers, the German Oriental Society of Leipzig and Halle, and other European societies of learning. Deceased became a member of our Association in 1870, at the meeting held in Baltimore, Md.

John P. Scherff, of Bloomfield, N. J., died in the State Hospital at Morris Plains, on

August 9th, 1901, after an illness of one year. Mr. Scherff was engaged in business at Glenwood and Washington avenues, and the store was one of the finest and most up-to-date in that city. He was born in Germany and came to this country when quite a young man. At an early age his attention was drawn towards the practice of pharmacy, which study he pursued with unusual diligence and marked success. After serving several clerkships with great credit to himself and his employers, at the age of thirty-one he engaged in the drug business for himself, which business he conducted up to the time of his death. His honest business traits won for him the esteem of the entire community, and his death caused a sad gloom over all. He was kind-hearted and charitable, always interesting himself in measures which tended to alleviate the burdens of others. Mr. Scherff was a large property owner and a director in the Bloomfield National Bank. He leaves a widow and two children to mourn his loss. Deceased became a member of our Association in 1887, at the meeting held at Toronto, Canada.

Edward Robinson Squibb, of Brooklyn, N. Y., died at his residence in that city, No. 152 Columbia Heights, on October 25, 1900, after a short illness, caused by the rupture of a blood vessel of the heart. Mr. Squibb was born in Wilmington, Del., in 1819, and was of Quaker parentage. After graduating from the Jefferson Medical College, Philadelphia, in 1844, he was appointed a surgeon in the United States Navy. After serving a number of years in that capacity, he resigned and started a laboratory on Furman street, Brooklyn, removing later to Doughty street, where his laboratory now is. In 1892, he announced the admission of his sons, Edward H., M. D., and Charles F., to the co-partnership of E. R. Squibb & Sons, which has since conducted the business established by him. His laboratory was three times destroyed by fire. In one of these fires, which occurred more than thirty years ago, he was severely burned by an explosion of ether and his face was permanently disfigured.

The death of Dr. Squibb removes from the ranks of medicine and pharmacy a unique and distinguished personality. An indefatigable worker and careful observer, of high intellectual attainments and positive convictions, a voluminous writer, he made for himself a place but few men attain in these professions. He was above all things a pioneer manufacturer of pharmaceuticals and chemicals, entering the field of American pharmacy at a period marked by the organization of the American Pharmaceutical Association. The originality, directness and simplicity of his methods early attracted attention, and many of his processes became official in the U. S. Pharmacopœia. His studies and work in improving the process of percolation are now classic, and his modifications of the process induced the introduction of the term "repercolation," a process which consists essentially of submitting the same menstruum to different and fresh portions of the drug to be exhausted. His various papers on this subject form an important part of the Proceedings of the American Pharmaceutical Association for the years 1865, 1866, 1867 and 1872.

As a member of our Association, he took an active part in its deliberations, contributing a paper of more than forty printed pages, entitled, "Notes and Suggestions Upon Some of the Processes of the U. S. Pharmacopœia, especially directed to the Committee of Revision." This paper is most noteworthy from the fact that it contains in outline his process for the manufacture of ether, spirit of nitrous ether, etc., and is a plea for the introduction into the Pharmacopœia of "that which relates to simple, reliable tests of purity of its materials and products." He took the advanced position that there were in this country no other means of controlling the manufacture and sale of bad articles than by disseminating the means of critical scrutiny and discrimination through authoritative channels. He was immediately appointed a delegate from the New York Medical Society and the New York Academy of Medicine to the Pharmacopœial Convention of 1860, by which body he was elected a member of the Committee of Revision and Publication of the Pharmacopœia. He was a delegate to the Pharmacopœial Convention of 1870,

and was elected a member of the Committee of Revision for 1880, a position he soon resigned. His contributions to medical literature are equally voluminous.

In 1869, he delivered a course of lectures on pharmacy in the New York College of Pharmacy, bringing the illustrative apparatus from his laboratory in Brooklyn. The lectures he continued for three years with great acceptance to the students, the conditions he imposed for this service being that he should receive no remuneration and should not be called professor.

As a citizen, he was public-spirited and benevolent, discharging the duties of life with great fidelity. He was a man of very positive convictions, and his manner of speaking, while not eloquent, was earnest and convincing.

Dr. Squibb was married to Miss Caroline F. L. Cook, of Philadelphia, in 1852, and she, with his two sons, Edward H., M. D., and Charles F., and one daughter, Mrs. John C. Munro, of Philadelphia, survive him. He was a member of the American Medical Association, the New York State Medical Association, Kings County Medical Society, a life member of our Association, American Philosophical and American Chemical Societies, the Metropolitan Museum of Art and many other societies of allied character. Deceased was one of the oldest members of our Association, having been elected in 1858, at the meeting held in Washington, D. C.

William Richard Warner, of Philadelphia, Pa., the senior member of the wholesale drug firm of William R. Warner & Co., and one of the most widely known manufacturing chemists in the United States, died at his home, 1306 North Broad street, on April 3, 1901, death being due to apoplexy. Mr. Warner was born on Christmas, 1836, in Caroline County, Maryland. Both parents died, and he was thrown on his own resources when he was a small boy. His education was limited to the ordinary country school and a short course in the Easton Academy. He began his business career as errand-boy in a drug store in Easton. He was of a studious turn of mind, and, besides attending to the duties of his position, he delved into the mysteries of natural history, botany, geology and paleontology. At the age of eighteen, he was writing scientific articles for the Easton *Gazette*, and among his correspondents were Prof. Louis Agassiz and Spencer F. Baird, of the Smithsonian Institution. He was also an expert taxidermist.

In the spring of 1856, Mr. Warner graduated from the Philadelphia College of Pharmacy, and shortly after started on a lecture tour through the State, showing experiments pertaining to the burning of ice, the combustion of gases and the administration of laughing gas. Shortly afterward he started in business in Philadelphia in the old Kensington district.

He was first in the retail business, but in 1866 he established the wholesale business at 154 North Third street. In 1876 he established himself in the six-story building at 1228 Market street, which later proved inadequate to the business. Ten years ago, Warner Hall, the seven-story building at Broad and Wallace streets, was erected and occupied by the firm.

In addition to his prominence in the business world, Mr. Warner enjoyed the distinction of having been the first man to manufacture sugar-coated pills. He is also said to have been the first to introduce licorice tablets. In 1860, he was appointed a member of the Committee of Revision of the United States Pharmacopœia, and was for many years connected with the Philadelphia College of Pharmacy. He leaves three sons to survive him, his wife having died in 1894. Deceased was a life member of our Association, and was one of its oldest members, having been elected in 1857, at the meeting held in Philadelphia, Pa.

Frank T. Wilhite, of Anderson, S. C., died at Johns Hopkins Hospital, Baltimore, Md., after a sudden illness on December 27th, 1900. Mr. Wilhite was born March 16th,

1857, and was the eldest son of the late Dr. P. A. Wilhite, a prominent physician, and a man of noble traits of character. His early school days were spent under Professor W. J. Ligon, a teacher noted for his thoroughness of work. After leaving school he went into the drug store of Wilhite & Williams as a clerk, and in 1878, when Williams sold out, he became a partner with his father under the firm name of Wilhite & Wilhite. In 1882, his brother J. O. Wilhite was taken into the firm and, after his father's death in 1892, he bought out the interest of his brother and continued the business alone until his death. Mr. Wilhite was a graduate of the National Institute of Pharmacy, located in Chicago, Ill., from which institution he graduated with high honors. As a business man, he was methodical. He had a place for everything and he always knew where to find it. He was trusted and was worthy of every trust reposed upon him. In 1889, when Anderson was practically without a hotel, he started the movement which resulted in the building of the hotel Chiquola, and subsequently became the President, Treasurer and General Manager up to the time of his death. In 1888, he was elected an alderman of the city, and greatly assisted in the work of establishing water-works and electric lights in the city of Anderson. Mr. Wilhite was a man of deep conviction. To those who knew him not he may have appeared distant and unsympathetic but he was ever ready to lend a helping hand to the poor and unfortunate. He was pure in mind and heart and clean in speech. His devotion to his afflicted mother, his sister and only brother, shows the nobility of his character. In his death his friends can justly claim that Anderson has lost one of her purest and one of her most progressive young men. Deceased became a member of our Association in 1893, at the meeting held in Chicago, Illinois.

Frank M. Wilson, of Willimantic, Conn., died very suddenly in that city on May 1st, 1901, at the age of fifty years. After receiving a common school education at an early age, his mind turned toward the direction of pharmacy. After duly serving an apprenticeship for several years, at the age of twenty years he embarked in the business as a clerk and subsequently as a proprietor, covering a period of thirty years. He was public-spirited to a remarkable degree. He subscribed to all public charities and took a prominent part in all public movements. He was active during the later years of his life in local politics, his personal popularity securing his election to several local offices which he filled very satisfactorily. In 1895, he was elected a member of the State Legislature, and filled the office with great credit to himself and his constituents. He was strictly honest, fair and conscientious in all his business dealings. His energy, prudence and far-sighted, broad-minded policy caused his business to expand in a marvelous fashion, and his ascent of the ladder of fortune was thereafter a simple matter. He was a man, honored, respected and admired by all his acquaintances. Whether it was a question of business or public good, his advice was always ready and always valued. He had the habit of succeeding in whatever he undertook. His minute accuracy and his steady perseverance gave him success. He had many lifelong friends, and his equable temper, as well as his love of making things bright for those around him, attached many people to him. He was a great lover of his home and spent there all his leisure moments. A widow and three children survive. Deceased became a member of our Association in 1883, at the meeting held at Washington, D. C.

Brinton W. Woodward, of Lawrence, Kansas, died of paralysis at West Chester, Pa., where he had been called through the illness of a sister in October, 1900. Mr. Woodward was born in East Marlboro, Chester County, Pa., February 14th, 1834. His ancestors on both sides can be traced far back in the families of old England. Brinton's early life was spent on a farm and in attending district school. He attended the school in which Bayard Taylor taught, and often mentioned that fact with pride. Young Woodward's education was completed at the age of 16, after a five years' course in a

near-by academy. He gained a good knowledge of mathematics and science. He then taught district school and later taught in the academy in which Bayard Taylor had taught. Mr. Woodward came to Kansas in May, 1855, and settled in Lawrence, then a village of mud-huts and shanties. In August he laid in a $2,000 stock of drugs and stationery and commenced business on Massachusetts street. This was the beginning of what is now, with one exception, the oldest drug house west of St. Louis, and the oldest business house in Kansas. In 1859, Mr. Woodward married Miss Lucy M. Wilder, a highly cultured lady from Massachusetts. In 1865 Mr. Woodward moved into the "round corner" building and put in a good stock of drugs, his trade finally increasing until he founded a wholesale department. In 1865 his wife died, and in 1866 he married Miss Emily Darlington, now his widow, a niece of the naturalist, William Darlington. In 1866, he was an active worker for and secretary of the St. Louis, Lawrence & Denver Railroad Company, until its completion to Lawrence in 1872.

In 1870 he made Frank Faxon his business partner, and in 1878 he and Faxon and James C. Horton established the Kansas City wholesale drug house, now Faxon, Horton & Gallagher, with the firm name of Woodward, Faxon & Co. Mr. Woodward withdrew from the Kansas City firm several years ago.

In Mr. Woodward was found the rare combination of literary and artistic taste with first-class business capacity, and throughout an active business career he never allowed his interest in literature and art to lag. He had traveled all over the United States during the past decade for health and rest, and his essays on his travels are very numerous and interesting. In 1881, Mr. Woodward collected a number of letters of travel and essays in criticism, most of which had been published in local papers, in a volume entitled, "Old Wine in New Bottles." Mr. Woodward has long been a collector of fine original paintings, and at present has the best private art gallery west of St. Louis, outside of Omaha and Kansas City. Among his collections are pieces by Mesdag, Inness, Detaille, Thalow and Lambinet.

His work along educational lines has been of great importance. As a member of the school board he secured the erection of Lawrence's first school houses, Central and Quincy, and in 1876, was made a regent of Kansas University, which position he held for many years. He was founder of the Old and New Club, an organization of highly educated Lawrence men, which is still active and in which he took a great interest. He was a prominent member of the State Historical Society and one of the founders and for a time President of the Kansas Pharmaceutical Association. Although his early education was limited to an academic course, not very complete at that, he was one of the most scholarly men in Kansas, and was especially dear to all of the early pioneers. He leaves one daughter and two sons, Mrs. Mary W. Doran, of Kansas City, Brinton D. and Chester Woodward. Deceased became a member of our Association in 1895, at the meeting held in Denver, Col.

In conclusion, your Secretary desires to express his deep appreciation of the many courtesies extended to him during the past year by the officers and members of the Association, by furnishing information on certain matters when asked, the promptness of which has considerable to do with making the duties of his office comparatively light and pleasant, and extends his sincere thanks to all.

Respectfully submitted,

GEO. W. KENNEDY,
Secretary of Committee on Membership.

Applause followed the reading of the report.

THE PRESIDENT: Gentlemen, you have heard the reading of the report of the Committee on Membership. What will you do with it?

Mr. Mayo, seconded by Mr. Lowe, moved to receive and refer to the Publication Committee. Carried.

The report of the Committee on Publication was called for, and the Secretary stated that as it had already been read with the minutes of the Council he supposed it was scarcely worth while to read it again, whereupon Mr. Diehl moved to dispense with the reading, and it was so ordered.

The report of the Committee on Transportation was then read by the Secretary:

REPORT OF THE COMMITTEE ON TRANSPORTATION.

Mr. President and Members of the American Pharmaceutical Association:

Your Committee on Transportation beg leave to report that application was duly made to the various traffic associations for reduced rates on account of the forty-ninth annual meeting, and that a rate of one and a third fare for the round trip, on the certificate plan, has been secured from the Western, the Central and the Southeastern Passenger Associations and the Trunk Line Association, covering the greater part of the United States. The New England Passenger Association and the Southwestern Passenger Bureau declined to grant a reduction of fare, which refusal unfortunately leaves the New England States and Texas without the benefits of a reduced rate. The States of Arkansas and Louisiana are not represented in any of the Passenger Associations. During the past few years the railroad companies have insisted on reimbursement for expenses of the Joint Special Agent who is sent to the meeting for the purpose of viséing all tickets purchased on the certificate plan, but not until this year have we been compelled to pay a double fee. The Central and Western Passenger Associations both claim jurisdiction over the city of St. Louis, it being on the border line of the two territories, and each demanded pay for their special agent before they would announce the reduced rate. Nothing was left to your committee but to pay the $22.00 demanded.

The 50,000 envelope slips which the General Secretary was directed by the Council to distribute for the use of the Transportation Committee were printed and mailed at a total expense of $29.83. Through the kindness of wholesale druggists and manufacturers in the cities of Boston, New York, Chicago, Denver, St. Paul, San Francisco, Dallas, Indianapolis, St. Louis, New Orleans, Cincinnati, Philadelphia and Baltimore, the slips were promptly distributed throughout the country, and grateful acknowledgment is hereby made to the many firms for this courtesy.

For the Committee, CHAS. CASPARI, JR., *Chairman.*

Mr. Kennedy, seconded by Mr. Lowe, moved to adopt.

MR. SEARBY: I want to say a word in relation to this question as affecting the Pacific Coast States. For several years I have been a member of this committee, and have endeavored by every means in my power to obtain some concession from the lines leading to the Pacific Coast, but I have been unable to do anything further west this year than Kansas City, and in previous years further west than Omaha; and, consequently, a trip to the meeting of the American Pharmaceutical Association is always a very costly one from the Pacific Coast, and unless a man has other business, or is a wealthy man, he cannot attend the meetings. I know of no means of redress, but merely mention the matter as a fact. It is a matter of regret to our far western members that they cannot get to these meetings at a reasonable rate.

MR. LOWE: Is there not some way to show the transportation companies their lack of

wisdom in this matter? They might increase their revenues very materially if they would make the concession, whereas at present they get nothing.

THE PRESIDENT: That is true, but I do not see any way to get around the matter.

Mr. Kennedy's motion to adopt was put and carried.

The report of the Committee on U. S. Pharmacopœia was called for, and Mr. Eliel started to read the report, but was interrupted by a motion from Mr. Oldberg to refer to the new Section on Practical Pharmacy and Dispensing.

MR. ELIEL: Would it not be better to refer this report to the Section on Scientific Papers, where it has always gone heretofore? The Section on Practical Pharmacy has an enormous lot of work cut out for it, and is limited to one session besides.

MR. SHEPPARD: I move as a substitute for Mr. Oldberg's motion that the report be referred to the Section on Scientific Papers.

And the motion was so put and carried.

The report of the Committee on National Legislation being next in order, Mr. Ebert, chairman, said that if it was proposed to refer the report to the Committee on Education and Legislation, as had heretofore been the custom, it would be well to do so before reading it. Mr. Sheppard made a motion to that effect.

MR. EBERT: The matter of national legislation has nothing to do with that Committee, and this matter ought to be brought before the Association as a whole. It has nothing to do with pharmacy laws in the States, though it has heretofore been referred to the Legislative Committee.

MR. SHEPPARD: I think the gentleman's remarks are largely of a technical character. This session of the Association always has before it so much general business that something is always crowded out, and I think this report ought to be referred to the Committee on Education and Legislation.

Mr. Dohme seconded the motion.

MR. EBERT: This is a matter that they would not take up there, because this refers especially to the stamp-tax. The Committee on Legislation has nothing to do with that. It is a matter of general interest to the Association, and it is important for it to be brought up before the Association in general session, and not referred to a Section.

MR. HYNSON: I move as a substitute for Mr. Sheppard's motion that this matter be taken up now.

And the motion was so put and carried.

Mr. Ebert read the report as follows:

REPORT OF SPECIAL COMMITTEE ON LEGISLATION.

To the Officers and Members of the American Pharmaceutical Association:

Your Special Committee on National Legislation respectfully reports that the subject which has engrossed the attention and work of the committee during the past year was

the removal of the stamp tax imposed upon the drug trade by schedule "B" of the Act of June 13, 1898. While the bill for the repeal of the measure was passing through the House, the individual members of your committee exerted themselves for the passage of the measure.

However, when the bill reached the Senate and by that body was referred to its Finance Committee, which reported favorably only on a part of the bill, this modification in some respects favoring legitimate professional pharmacy by recognizing the United States Pharmacopœia and the National Formulary, and by the abrogation of the tax on the preparation of these standards, yet as the remaining tax would bear upon the retail druggists of this country and be an unjust burden upon the drug trade, your committee addressed the following letter to the members of the Finance Committee of the Senate:

"*Dear Sir:* The members of the American Pharmaceutical Association, with all others who have any interest in the legitimate drug trade in this country, are vitally interested in the repeal of the war tax on medicinal preparations and other articles which enter largely into the stock of every druggist. We are confident that Congress never intended so to legislate as to do injustice to any class of citizens. Yet no fair minded man can study the practical operations of the tax imposed by schedule 'B' and not reach the conclusion that a very heavy and a very unjust burden has been placed upon the drug trade by the War Revenue Act.

"In the first place, the tax upon medicinal preparations is not a tax upon luxuries, but upon articles which are in every proper sense of the word necessaries. Furthermore, this tax is not, and the experience of retail druggists in all sections of the country demonstrates that it cannot be shifted to the consumer. The entire weight of the tax falls upon the members of the drug trade, who, in this respect, are singled out from nearly all others in the business community. Our fellow-citizens who deal in dry goods, groceries, boots, shoes, furniture, and a thousand other articles, go absolutely free of all special federal taxation, while more than one-half of the druggist's stock is subjected to a heavy tax; and this tax is so levied as to create a maximum amount of trouble to all concerned. Directly and indirectly, it deprives the members of the drug trade, and especially the retail druggists, of a share of their earnings equivalent to a heavy income tax. Unless it was the purpose of the bill to do this, the intention of the law-makers has clearly miscarried.

"Of the $3,000,000 or $4,000,000 of the tax on medicinal preparations and similar articles, it is impossible to sta e with exactness how much is paid, directly or indirectly, by the retail druggists. What we do know is this:

"*First:* That many of the large manufacturers, upon the imposition of the tax, added the tax to the price of their goods, thus shifting the burden to the retailer; and it is universally true that the retailer has not been able to collect it from the consumer.

"*Second:* That nearly all pharmacists put up domestic remedies (including such well-known articles as Seidlitz Powders, Solution of Citrate of Magnesia, Essence of Ginger, Tincture of Arnica, etc.) for their own local trade; and upon such preparations, so put up, they are obliged to affix revenue stamps. This is a great annoyance and a very great burden.

"*Third:* In those cases where the large manufacturers do not add the tax to their price, it is easy to see that the tax upon them must be a heavy one. While this is a phase of the matter with which retailers are not directly concerned, it is mentioned for the purpose of showing that many manufacturers and all the retailers feel the injustice of this tax.

"When it is considered that the retail druggist shares with his fellow citizens the burden of all general taxation, state and national, and that in addition to this he pays a heavy tax on alcohol (which is an absolutely necessary ingredient in many of the articles

which he compounds) and also a special annual tax of $25 as a retail liquor dealer, because he is obliged to handle alcohol, it is surely unjust to impose upon his business a still further burden in the shape of this stamp tax on medicines, toilet articles, etc.

"The House of Representatives, having passed a bill which will relieve us of this burden, the members of this Association earnestly hope that the Honorable Senate of the United States will concur in the action of the House and give us the relief which we believe should not in justice be withheld.

"Respectfully yours, ALBERT E. EBERT,
Chairman Special Committee on Legislation of the American Pharmaceutical Association.

In addition to the above, the following letter was addressed to each member of this Association residing in the states represented by the respective members of the Finance Committee of the Senate:

"CHICAGO, *January* 12, 1901.

"*Dear Sir:* The war tax on medicinal preparations is not yet repealed and there is still need for work if we are to secure relief. The bill passed the House all right; but it has been tied up in the Senate Finance Committee for nearly a month, and there is reason to fear that influence is being brought to bear to defeat the repeal of this tax.

"Hon. ———— of your state is a member of the Senate Committee and will have much influence in determining whether or not the drug trade will be relieved of this unjust tax. Please write him an earnest letter on the subject immediately. Every hour is now valuable, for unless we succeed in getting relief from this burden at the present session of Congress, we may not get it for many years to come.

"The enclosed copy of a letter sent by this committee to members of the Senate Committee will indicate our view of this matter.

"Please do not fail to write to your Senator.

"Very truly yours, ALBERT E. EBERT, *Chairman.*"

Similar letters were also addressed to the officers and prominent members of our Association, requesting their support in the position taken by this committee. By the foregoing action of your committee, aided by the work and influence of the pharmaceutical press and the pressure brought to bear upon the Finance Committee by the different associations and individuals, the results sought for were accomplished and schedule "B" was repealed.

The successful termination of these efforts for the repeal of the stamp tax is another and signal illustration of the important influence of organization and unity of action on the part of the members of our profession.

In conclusion, we desire to suggest that this committee be made permanent; that its membership be reduced to the original number of three members; that the Chairman be selected from the city of Washington, and the other two members be selected one each from the two largest cities in the country; and finally, that all matters relating to pharmacy depending upon congressional action for their successful achievement be committed into the charge of this committee.

Respectfully submitted,
ALBERT E. EBERT, Chicago, *Chairman*,
C. B. LOWE, Philadelphia,
WM. S. THOMPSON, Washington, D. C.,
A. B. LYONS, Detroit, Mich.,
H. P. HYNSON, Baltimore.

First Vice-President Beal had taken the Chair during the reading of the report, which was received with applause.

Mr. Sayre moved to receive and adopt. Carried.

The report of the Committee on National Formulary being called for, Mr. Diehl, Chairman, suggested that the report of the committee be referred to the Section on Practical Pharmacy and Dispensing, and it was ordered to take that course.

The report of the Committee on Simultaneous Meeting of the American Pharmaceutical Association and the National Association of Retail Druggists was then presented by Mr. Hynson as follows:

REPORT OF COMMITTEE TO SECURE A JOINT MEETING WITH THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

To the Officers and Members of the American Pharmaceutical Association:

Your committee appointed to secure a joint meeting of the National Association of Retail Druggists, and this Association respectfully reports that the matter was properly presented to that association at its second annual meeting at Detroit, last October, by one of our members, Mr. Hopp, who was most courteously treated. The proposition was regularly referred to the Executive Committee of the National Association of Retail Druggists, and we enclose with this report, the correspondence had with the Secretary of that body.

Very respectfully,

HENRY P. HYNSON,
J. M. GOOD.

November 1, 1900.

"MR. THOMAS V. WOOTEN, SEC'Y, CHICAGO, ILL.

"*My Dear Sir:* I am reminded by Prof. Caspari, Secretary of the American Pharmaceutical Association, who is about to publish the proceedings of the Richmond meeting, that the exact date of the meeting to be held at St. Louis during September, 1901, must be fixed by the Council of that body very soon, and that it will be necessary to have a report from the committee appointed to confer with the National Association of Retail Druggists regarding simultaneous meetings of the two organizations, or meetings closely following each other, as was suggested and favorably acted upon at Richmond.

"The matter was presented officially to your association at Detroit by Mr. Hopp and was, I understand, referred to your Executive Committee. I can readily understand why this body may not yet be ready to take action in regard to its next meeting-place, therefore, ask no more now, if action has not been had, than that at an early moment it express simply its preference of days, in September of next year, that the date of the meeting of the Association I represent may be fixed; the matter of a combination meeting, or what not, can be considered subsequently.

"I beg to assure you that the American Pharmaceutical Association is heartily sincere in its desire to fraternize with your association and earnestly request you and your colleagues to do everything in your power to meet its wishes, that is consistent with the plans and interests of your own organization.

"Very truly yours, HENRY P. HYNSON."

November 8, 1900.

"MR. HENRY P. HYNSON, 423 N. CHARLES ST., BALTIMORE, MD.

"*Dear Mr. Hynson:* Replying to yours of the 1st inst., which the removal of our office from the ninth to the sixth floor of the building in which we are located has prevented my answering with greater promptness, I have referred the matter of which you write to our Executive Committee.

"As soon as I shall have heard from the Committee (I trust its decision can be had promptly) I shall write you.

"With cordial good wishes, sincerely yours,

THOS. V. WOOTEN, *Secretary*."

December 8, 1900.

'MR. HENRY P. HYNSON, CHAIRMAN, 423 N. CHARLES ST., BALTIMORE, MD.

"*Dear Mr. Hynson:* I am directed by our Executive Committee to say that just now it is impossible to arrive at any decision as to the date at which our 1901 convention will be held. There are several considerations which interfere with reaching a conclusion, and the committee believes that in all circumstances it is best for the American Pharmaceutical Association to select the time for holding its meeting without waiting for the decision of our Committee. At its first meeting the Committee will consider the desirability of holding its convention at the same place and at, or near, the same time as that decided upon by the A. Ph. A.

"I am directed to say that the Committee appreciates the cordial tone of your letter, and that the members of our organization regard with feelings of satisfaction the action of the American Pharmaceutical Association in originating and discussing favorably the project of holding simultaneously, at the same place, the meetings of the two associations. It will be a pleasure to write you immediately after the meeting of the Committee to which I have referred.

"With best wishes for the continued success of the organization you represent, and with sincere personal regards, I remain,

"Very truly yours, THOS. V. WOOTEN, *Secretary*."

BALTIMORE, *June 17, 1901.*

"MR. THOS. V. WOOTEN, SEC'Y NATIONAL ASSOCIATION RETAIL DRUGGISTS, CHICAGO, ILL.

"*My Dear Mr. Wooten:* I understand that your executive committee has about decided to hold the next meeting of your Association at Buffalo, and that a joint meeting of that and the American Pharmaceutical Association will be impossible this year. I write to ask that you give me such a communication as I can present to the body I represent, as a part of my report upon the matter in question.

"With kind regards and hoping your duties or your pleasure will bring you to Baltimore soon, I am,

"Very truly yours, H'Y P. HYNSON."

June 24, 1901.

"MR. HENRY P. HYNSON, 423 N. CHARLES ST., BALTIMORE, MD.

"*My Dear Mr. Hynson:* Replying to yours of the 17th inst., which absence from Chicago has prevented my answering with greater promptness, our executive committee has decided that the 1901 convention of the N. A. R. D., shall be held at Buffalo, as you suggest.

"One of the reasons why the committee could not in justice to the association meet in joint convention with the American Pharmaceutical Association this year, is that our convention in 1898 was held in St. Louis, the city in which you are to convene. Inasmuch, also, as our conventions have all been held in western cities, it was believed that the interests of the N. A. R. D. would be served by our going farther east for the convention of 1901.

"Allow me to say that in the discussion of this subject the high esteem in which the American Pharmaceutical Association is held by the members of the committee was at

all times apparent, and the hope was expressed that the cordial feeling of mutual helpfulness between the two bodies may be perpetuated to the advantage of both.

"Acknowledging with pleasure the kindly personal sentiments to which you give expression, and with assurances of regard,

"Sincerely yours, THOS. V. WOOTEN, *Secretary*."

Mr. Anderson moved to receive and adopt. Carried.

MR. EBERT: I hope this invitation will be extended to the National Association of Retail Druggists for the Philadelphia meeting. I think there would certainly be no objection to having a simultaneous meeting at that time, and it would bring together the pharmacists of the country. I hope another invitation will be extended to them to meet with us in Philadelphia in 1902.

The suggestion of Mr. Ebert was adopted.

Mr. Ryan presented the report of the Special Committee on Weights and Measures as follows:

REPORT OF SPECIAL COMMITTEE ON WEIGHTS AND MEASURES.

To the President and Members of the American Pharmaceutical Association:

Your Committee, through its Chairman, begs leave to submit the following report on the status of the Metric System of Weights and Measures in the United States:

During the past year some definite progress has been made towards the adoption of the Metric System in the various departments of our government. Although the final result is by no means certain, another step in the right direction has been taken. The Committee on Coinage, Weights and Measures of the House of Representatives, through its Chairman, Mr. Southard, reported the following bill with a favorable recommendation on March 1st, 1901:

"A BILL to adopt the weights and measures of the metric system as the standard weights and measures in the United States.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That on and after the first day of January, nineteen hundred and three, all the Departments of the Government of the United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; on and after the first day of January, nineteen hundred and three, the weights and measures of the metric system shall be the legal standard weights and measures of and in the United States."

This bill was committed to the Committee of the whole House on the state of the Union, and ordered to be printed. It is hoped that it may receive consideration at the coming session of the 57th Congress.

Owing to the many changes in the membership of the House of Representatives, it will be necessary to acquaint a large number of new members with the advantages to be gained by the adoption of this measure, and your Committee would request the active support of the individual members of this Association in an effort to convince their Representatives in Congress of the desirability of the adoption of the Metric System.

Although the growth of the use of the Metric System by physicians is not as rapid as we would wish, its adoption in manufacturing enterprises is certainly encouraging. While our Government at Washington has taken about thirty-four years to think the subject over, our practical business men are likely to settle the question in many lines of trade by adopting Metric measurement for carrying on foreign business transactions.

The expanding foreign commerce of our country will have an important bearing upon the final outcome of this question. The advocates of the Metric System have now the support of nearly all of the trade press and many of the leading daily papers actively advocate its adoption.

It is not to be supposed that the millions of dollars invested in intricate machinery is to be lost by discarding the latter and replacing with new models built on Metric Measurements, but a gradual change can be made and this as rapidly as demands will warrant. Probably no form of occupation using weights and measures could make the complete change with less expense than those of medicine and pharmacy. It is perfectly obvious that pharmacists can never wholly discard the old systems of weights and measures until such time as physicians shall entirely abandon their use. As we have before advocated, it will be necessary for our medical colleges to teach their students only in terms of the Metric System, and in a comparatively brief period the change from the old to the new can be accomplished in so far as our occupation is directly concerned.

Appended to this report we submit the complete report of the Committee of the House of Representatives, which includes the bibliography of the documents presented to Congress from the year 1790 to 1896. Should it meet the approval of your Committee on Publication, we would recommend that this bibliography be printed in the Proceedings of this Association for the purpose of future reference.

Respectfully submitted, F. G. RYAN, *Chairman.*

56TH CONGRESS, *2d Session.* HOUSE OF REPRESENTATIVES. REPORT No. 3005.

METRIC SYSTEM OF WEIGHTS AND MEASURES.

MARCH 1, 1901.—Committee of the Committee of the Whole House on the state of the Union and ordered to be printed.

Mr. Southard, from the Committee on Coinage, Weights, and Measures, submitted the following

REPORT.

[To accompany H. R. 5768.]

The Committee on Coinage, Weights, and Measures, to which was referred House Bill 5768 to adopt the weights and measures of the metric system as the standard weights and measures in the United States, having duly considered the same, respectfully report as follows: That said bill be amended by striking out in line 3 the word "from" and inserting the word "on," so as to make the same read "on and after." Second, in line 4, after the word "and," strike out "one" and insert "three." Third, in line 8, after the word "system," insert "on;" also in line 8 strike out "from" and insert "after," so as to make the bill read "on and after the first day of January." Fourth, in line 9 strike out "two" and insert "three," so as to make the bill read "nineteen hundred and three." Fifth, in line 11, after the word "measures," insert the words "of and."

As amended, your committee recommend that the bill do pass.

For several consecutive Congresses preceding the Fifty-sixth Congress bills have been introduced looking to the adoption of the weights and measures of the metric system as the standard weights and measures of this country, and in each Congress the proposition has received the favorable consideration of the Committee on Coinage, Weights and Measures. The obvious advantages of the system as compared with the system or systems now in use have impressed all who have given the subject serious consideration. Voluminous reports have been made from time to time, clearly setting forth the disadvantages of the highly complex systems of weights and measures now in use in the United States and the greatly superior facilities offered by the metric system.

It is not the purpose of the committee to add to the literature on the subject at the present time, as the same has been so fully and so frequently covered in previous reports.

One of the great advantages offered by the metric system in comparison with the existing system is in the economy in time and intellectual energy necessary to its use.

A brief but clear statement of the situation is made in a document recently issued by the American Metrological Society, as follows:

1. In comparison with the existing system, it offers enormous economy in time and in the intellectual energy necessary to its use.

This is because of its simplicity, the number of fundamental units being few and all others derived therefrom. In the customary system there are very many units of length, volume, area and mass, or weights having no simple relation to each other, and often the same name is used for measures totally different. The metric system is founded primarily upon the meter, which is the unit of length, and all others are so related to this as to greatly facilitate the making of all sorts of calculations in which weights and measures are involved.

This simplicity is greatly enhanced by the fact that the system is decimal throughout, ten or some multiple of ten being the only ratio used. In this respect it is precisely similar to the money system of the United States, the great superiority of which, in the matter of ease in calculation, no one can question. The clumsiness of the system in use a hundred years ago, in which pounds, shillings and pence were units of value, is generally admitted; but this system was simplicity itself compared with our present system of weights and measures, with our various pounds, varieties of ounces, our yards, rods, chains, links, miles, inches, feet, poles, perches, acres, roods, gallons, bushels, barrels, hogsheads, chaldrons, long and short tons, pennyweights, scruples, drachms, etc., almost *ad infinitum*.

It is tolerably certain that no living person knows all of the units of measures in common use in various parts of the country, and surely no one knows the whole of their complex relationship. In the United States there are doubtless several billions of transactions, small and large, every year in which weights and measures are involved. It is believed that the use of the metric system would lessen the labor involved in the necessary calculations by at least one-half and very probably by three-quarters.

John Quincy Adams declared that as a labor-saving device the system was equal to the steam engine, and the steam engine has multiplied the effective laboring population of the United States many fold.

2. There would be a very large saving of time in learning the system as compared with that now expended in acquiring what is after all a very imperfect knowledge of the customary weights and measures. No one can easily forget his youthful attempts to memorize long and generally almost meaningless tables and to master the mysteries of addition, subtraction, multiplication, and division of "compound numbers." Compare the problem of finding out how many acres in a rectangular field whose length is 6 furlongs, 17 rods, 3 yards, 2 feet and 7 inches, and whose breadth is 10 rods, 4 yards, 1 foot and 5 inches, with that of find the cost of 17,327 pounds of anything at $104.15 a pound, and the tremendous superiority of the decimal system is very evident. Conservative educators have estimated that the use of the metric instead of the customary system of weights and measures would result in a saving of from one to two years of the school life of every child. The already overcrowded curriculum of the public schools makes this a matter of the highest importance, and so great an economy would alone justify the adoption of the decimal system.

3. The probability of error in calculations and in all uses of weights and measures would be vastly less were the decimal system used. The great simplicity of all operations would of itself insure this; but accuracy is greatly enhanced by the fact that only a very few things must be remembered in the metric system, and the danger of confusing units is almost nothing. It has been urged by some opponents of the system that the accidental misplacing of the decimal point would give rise to frequent error. Of all mistakes this is the one most certain to be detected, as the effect is to make the quantity ten or more times too large or ten or more times too small, and so great a change will rarely escape notice. As a matter of fact experience with our decimal money system proves that it is a mistake very rarely made.

Mistakes in the practical use of weights and measures are sometimes very serious and indeed fatal in their consequences, as in the case of the sale of drugs and in compounding prescriptions. The recognition of the fact that the use of the metric system would greatly lessen the frequency of such mistakes resulted several years ago in the adoption of the system by druggists and pharmacists very generally and its exclusive use in the United States Pharmacopœia. Some of the largest wholesale dealers in drugs in the country have long ago abandoned the use of the customary weights and measures for that of the metric system. It has also been found that the use of the metric linear units, the meter and its subdivision, tends to a greater precision in mechanical operations, to say nothing of the greater convenience with which it is used.

4. One of the most important reasons for its adoption by the United States is that it is the international system of weights and measures. Its recent adoption by the Russian government leaves, practically, among the civilized nations of the world, only the United States and Great Britain not using it. As these nations use measures essentially the same, it may be said that they are now backing the foot and the pound against the meter and kilogram supported by all the rest of the world. It is time that they are justified in considering themselves the two greatest nations of the world, and in trade and commerce they are not surpassed. But it must not be forgotten that their great desire is to establish and maintain trade with nations using the metric system exclusively. As the people of these nations have long ago learned the superior convenience of that system, they will not trade in any other if they can avoid it. Germany and France here have a decided advantage over England and the United States and have not been slow to improve their opportunities.

It is this fact that has stirred conservative England to an active interest in the decimal system beyond anything yet manifested in this country. Committees of Parliament have unanimously reported in favor of the system, and they have been, and are, backed by boards of trade, chambers of commerce, trades unions, guilds of all sorts, mercantile and manufacturing associations, educational and scientific societies, etc., almost without number. The practical sense of the Englishman is broadly awake to the fact that his obstinate adherence to a clumsy and unscientific system of measurement is one of the large factors in the relative diminution of English trade and manufacture, and he is almost sure to remedy this difficulty in the near future. What is true in England is even more true in the United States. We are only just beginning our efforts to win a fair share of the markets of the world, but many of our manufacturers have already found it necessary to adopt metric units in the construction of machinery for foreign export. At this particular time its general adoption would be of the greatest assistance to our foreign trade. Besides, we have recently brought into our fold a considerable population long accustomed to the use of the metric system, and our intercourse with them would be greatly facilitated by its adoption.

5. The metric system is already in extensive use in this country as it is also in England. For more than thirty years it has been used to the practical exclusion of all other weights and measures by scientific men and in scientific books and other publications. It has long been in use by several Government bureaus, and its exclusive use has been recommended by nearly all of them. The whole system of electrical measurement, on which now depend the profits of hundreds of millions of invested capital, is based on the metric units of length and mass, and Congress has already legislated upon this. By no conceivable chance could the foot and pound ever displace the meter and kilogram in the already enormous and still rapidly growing electrical industries.

The only serious objection that has been or can be urged against the adoption of the system is the alleged great expense and inconvenience incident to a change in large manufacturing establishments. It is not denied that a change from one system to another will imply some cost and some inconvenience, but the extent and importance of

them have been greatly exaggerated. In these days of continual improvement in machinery and methods of manufacture, new patterns and new models are constantly being brought out, and in their construction the introduction of new units will cause little difficulty.

A sufficient answer to this objection is that it has already been met and successfully by other nations, the result being that manufacturing interests and facilities were not only not injured, but were greatly advanced. Very large and important establishments in England and in this country have already made the change and with entirely satisfactory results. It is not expected that such a transformation would be accomplished in a short time. We have the history of the adoption and introduction of our money system as an illustration of this. For nearly fifty years after Congress had enacted this system relics of that abandoned by law were everywhere in evidence. But during all of this time no one would have favored a return to the old system, because its use was not immediately discontinued. No other nation can boast of so high an average of intelligence as exists in the United States, and in no other nation would the change be actually accomplished so easily and so promptly as here, when once the international system becomes the legal system of weights and measures.

The following bibliography will be found useful to those who wish to give the subject careful study:

Bibliography (1790 to 1896).

Date.	Subject.	Number of pages and size.
	NOTE.—The titles which are here given of papers having an official character or a historical interest relating to U. S. Standard Weights and Measures, and which were printed or published between 1790 and 1830, have been taken (with some slight changes) from Poore's Descriptive Catalogue of Government Publications of the United States, 1774 to 1881.	
1790.		
Jan. 8.....	Annual message to Congress. President Washington. [First Congress, second session.] The President urges the importance of uniformity in the currency, weights, and measures of the United States.	
July 4.....	Report on Weights, Measures, and Coinage—By Thomas Jefferson, Secretary of State. [Ex. Docs., First Congress, second session.] On the subject of establishing a uniformity in the weights, measures, and coins; consideration upon the use of the pendulum as a measure of determinate length; recommends that the standard of measure be an uniform cylindrical rod of iron of such length that it shall perform its vibrations in small and equal arcs in one second of mean time; weights and measures in use in Great Britain; reports of committees of the House of Commons in 1757–59; examination of the system of measures in use in the United States; standard for coins; recommendations for changes in the weights and measures in the United States; the measures, weights, and coins of the decimal system, estimated in those of England, now used in the United States.	
1791.		
Oct. 5.....	Annual message to Congress. [Second Congress, first session.] President Washington calls attention to the necessity of action upon the subject of uniformity in currency, weights, and measures.	
1792.		
Apr. 5.....	Report of the Committee on Weights and Measures—R. Izard, Senator.... [Journal of the Senate, Second Congress, first session, pp. 173, 174.] Fixing a standard for weights and measures; directions for the scientific construction of a standard rod; division of the rod into five equal parts, one of which shall be called a foot; measures in the survey of lands; units of weight.	2.
1795.		
Jan. 9.....	Communication from minister of French Republic. [Ex. Docs., Third Congress, second session.] Regarding the adoption by the United States of a system of weights and measures conformable to that lately adopted by France; detailed description of the new method; standards of mensuration; standard of weight; division of the standards into decimal parts.	

Bibliography (1790 to 1896)—Continued.

Date.	Subject.	Number of pages and size.
1796.		
Apr. 12	Reports on Weights and Measures—Representative Carter B. Harrison .... [Ex. Docs., Fourth Congress, first session.] Regulations of the standard of weights and measures; divisions of the pound; divisions of the ounce; scientific experiments to be made by scientists to be employed by the Government to fix upon a standard of weights and measures.	7.
1819.		
Jan. 25.....	Report on a Standard of Weights and Measures—Select committee of Congress. [House Docs. No. 109, Fifteenth Congress, second session. Vol. VI.] Recommends that models of the yard, bushel, and pound, conforming to those in most common use, be made under the direction of a commission to be selected by the President, and which, if satisfactory to Congress, shall be declared the standard weights and measures of the United States.	12.
1821.		
Feb. 22.....	Report on Weights and Measures—By John Quincy Adams, Secretary of State. [Ex. Papers, No. 109, Sixteenth Congress, second session. Vol. VIII.] Plan of a standard of weights and measures to be adopted by the United States, prepared in conformity with a resolution of the House of Representatives dated December 14, 1819.	245.
1822.		
Mar. 11	Report on Weights and Measures—Select committee..... [Reports of committees, No. 65, Seventeenth Congress, first session, Vol. I.] The President of the United States should be requested to obtain for the use of the different States and Territories duplicates of the English measures, weights, etc.	4.
1830.		
May 29	Extract from Senate Journal: On motion of Mr. Woodbury, and by unanimous consent, *Resolved*, That the Secretary of the Treasury be directed to cause a comparison to be made of the standards of weights and measures now used at the principal custom-houses in the United States, and report to the Senate at the next session of Congress. NOTE.—The titles which follow of the reports and other documents relating to United States weights and measures have been taken chiefly from copies of the documents themselves on file in the libraries of the Coast and Geodetic Survey and the Office of Standard Weights and Measures. The greater part of them are found in three bound volumes, octavo, viz.: Coast Survey and Weight and Measure Documents, 1832 to 1843; Congressional and Departmental Documents, Vol. I, 1830–1856, Vol. II, 1857–1889.	
1831.		
Mar. 3	Report on Weights and Measures—By S. D. Ingham, Secretary of the Treasury. [Senate Docs., No. 74, Twenty-first Congress, second session. Vol. II.] Relative to comparison of weights and measures used in custom-houses.	2, octavo.
Apr. 30 and June 18.	Letters of the Secretary of the Treasury to F. R. Hassler, Superintendent United States Standard Weights and Measures, respecting permanent standards of weights and measures for the Treasury Department, the manufacture of weights and measures for all the custom-houses in the United States, and the adoption of units of weight and of capacity.	2, octavo.
1832.		
Mar. 5	An enumeration by Mr. Hassler of the objects and statements desirable to form a collection of standard weights and measures of foreign countries for the Department of State of the United States.	3, octavo.
June 20	Report of the Secretary of the Treasury, in compliance with a resolution of the Senate, showing the result of an examination of the weights and measures used in the several custom-houses in the United States. [Twenty-second Congress, first session, Doc. No. 299, House of Representatives.]	122, octavo.
1834.		
July and Aug., and Jan. and Feb., 1835	Correspondence with the Secretary of the Treasury, and reports of progress in the construction of standard weights and measures. F. R. Hassler, superintendent.*	20, octavo.

*Contained in volume with the following title: Documents relating to the construction of uniform standards of weights and measures for the United States, from 1832 to 1835. Published by F. R. Hassler, superintendent of the work. New York: Printed by John Windt, 1836.

Bibliography (1790 to 1896)—Continued.

Date.	Subject.	Number of pages and size.
1835.		
Feb. 27.....	Mr. Binney, from select committee to which the subject had been referred, made the following report on a memorial from citizens of Philadelphia, praying Congress to establish a standard of weights and measures throughout the Union, and uniform mode of applying and conforming to the same. [Twenty-third Congress, second session, Report No. 132, House of Representatives.]	31, octavo.
Dec. 26	Letter from the Secretary of the Treasury, transmitting information in relation to a standard of weights and measures. [Twenty-fourth Congress, first session, Doc. No. 32, House of Representatives—Treasury Department.]	7, octavo.
1836.		
Jan. 30.....	Report of the Committee on Commerce in relation to the expediency of furnishing the States and Territories with the standard weights and measures selected and adopted by the Executive, to be used in the collection of the revenue of the United States. [Twenty-fourth Congress, first session, Report No. 259, House of Representatives.]	2, octavo.
Mar. 21	Mr. Pinckney, from the Committee on Commerce, submitted a report on a resolution directing them to inquire into the expediency of providing for the distribution among the States and Territories of the same standards of weights and measures which have been ordered to be provided for the custom-houses. [Twenty-fourth Congress, first session, Report No. 449, House of Representatives.] NOTE.—This is a report substantially the same in effect as the one of January 30, 1836, and recommends the adoption of the same resolution.	2, octavo.
1836.		
Apr. 30 and May 13, 18.	Correspondence with the Secretary of the Treasury in relation to a comparison of the Troy pound sent from England with the Troy pound of the United States Mint, and relative to the construction of standard weights for the United States Mint at Philadelphia.	5, octavo.
June 16	Letter of the Secretary of the Treasury to F. R. Hassler, Superintendent of Weights and Measures, inclosing copy of a joint resolution of Congress in regard to the preparation of complete sets of standard weights and measures for each of the States of the Union.	8, octavo.
June 17	Reply of Mr. Hassler to the Secretary.....	2, octavo.
1836.		
July 28 and Aug. 10.	Letters of Mr. Hassler to the Secretary relating to the completion and delivery of six sets of standard weights, one set to the Treasury Department and five sets for custom-houses.	2, octavo.
Nov. 19	Report of progress in the construction of standard weights and measures, by F. R. Hassler, Superintendent. [This report is combined with that of the Coast Survey.]	2, octavo.
1837.		
Nov. 18	Report of F. R. Hassler, Superintendent Weights and Measures, upon the establishment of the system of ounce weights for the mints of the United States. [Above forms part of Senate Doc. No. 79 and of House Doc. No. 20, Twenty-fifth Congress, second session.]	10, octavo.
1838.		
June 26	Report to the Treasury Department of the United States upon the construction and completion of the standards of weight for all the States of the Union. [House Doc. No. 454, Twenty-fifth Congress, second session.]	6, octavo.
July 3.....	Letter from the Secretary of the Treasury, transmitting a report of F. R. Hassler, stating that complete sets of standard weights and measures for the respective States of the Union have been prepared and are now ready for delivery. [House Doc. No. 454, Twenty-fifth Congress, second session—Treasury Department.]	
Nov. 14	Seventh report of F. R. Hassler, as superintendent of the construction of standards of weights and measures. [Part of Senate Doc. No. 4, Twenty-fifth Congress, third session.]	1, octavo.
1839.		
Nov. 16....	Upon the construction of the standards of weights and measures ..... [Part of Senate Doc. No. 15 and of House Doc. No. 20, Twenty-sixth Congress, first session.]	2, octavo.

Bibliography (1790 to 1896)—Continued.

Date.	Subject.	Number of pages and size.
1840.		
July 10.....	Report upon the completion of the standard yard measures for the respective States—by F. R. Hassler, superintendent of weights and measures. [House Doc. No. 261, Twenty-sixth Congress, first session.]	6, octavo.
Nov. 17	Upon the construction of standard weights and measures ..... [Part of House Doc. No. 14, Twenty-sixth Congress, second session.]	1, octavo.
1841.		
June 22	Report upon the completion of the standard ounce weights for all the States of the Union—by F. R. Hassler, superintendent of weights and measures. [House Doc. No. 33, Twenty-seventh Congress, first session.]	4, octavo.
1842.		
April 5.....	Report upon the construction of standards of liquid capacity measures, with descriptions of the apparatus devised for standarding, tables of last weighings, and ultimate results of adjustment. With 3 illustrations. [Senate Doc. No. 225 and House Doc. No. 176, Twenty-seventh Congress, second session.]	26, octavo.
June 29	Report of F. R. Hassler upon the work of the establishment of uniform weights and measures for the United States, made upon a call from the select committee of the House of Representatives.	17, octavo.
Dec. 19	Letter from the Secretary of the Treasury, transmitting a report of Prof. Hassler, superintendent of the Coast Survey, the last paragraphs of which relate to weights and measures. [House Doc. No. 23 and Senate No. 11, Twenty-seventh Congress, third session—Treasury Department.]	
1843.		
Mar. 2	Committee on Commerce (Mr. Randall), to whom was referred the petition of William Nixon, reports adversely to the adoption of the metric system of weights and measures. [House Report No. 285, Twenty-seventh Congress, third session.]	
Apr., June, and Nov., and Jan. 31, 1844.	Reports of F. R. Hassler, as superintendent of the construction of standards of weight and measure, upon the progress of the work in the construction of standards since December, 1842. [House Doc. No. 94, Twenty-eighth Congress, first session.] Report transmitted to Congress by the Secretary of the Treasury after the death of Mr. Hassler, together with a tabular statement of the work executed for the system of uniform standards for the United States from the beginning of the year 1836 to June, 1842, with their state at that epoch, and the additions made until November, 1843. Six illustrations.	
1845.		
Feb. 26, 27..	Report of Alexander Dallas Bache, Superintendent, on the construction of standard weights, measures, and balances for the year 1844. [Senate Doc. No. 149 and House Doc. No. 159, Twenty-eighth Congress, second session.]	32, octavo.
1846.		
Apr. 25 and Aug. 7.	Report upon the progress made in the construction of standard weights, measures, and balances in the year 1845, under the superintendence of A. D. Bache. [Senate Doc. No. 483, Twenty-ninth Congress, first session.]	23, octavo.
1848.		
July 30 and Aug. 12.	Report to the Treasury Department, by A. D. Bache, on the progress of the work of constructing standards of weights and measures and balances in the years 1846 and 1847. Four illustrations. [Senate Ex. Doc. No. 73 and House Ex. Doc. No. 84, Thirtieth Congress, first session.]	29, octavo.
Dec. 12	Report from the Secretary of the Treasury of scientific investigations in relation to sugar and hydrometers, made under the superintendence of A. D. Bache, by Prof. R. S. McCulloch. Revised edition by order of the Senate. [Senate Ex. Doc. No. 50, Thirtieth Congress, first session.]	
1851.		
Feb. 7, 10 ..	Letter from A. D. Bache, Superintendent of Weights and Measures, communicating a report of the computation of a manual of tables to be used with the hydrometers recently adopted in the United States custom-houses. With six illustrations. [Senate Ex. Doc. No. 28, Thirty-first Congress, second session.]	168, octavo.
1856.		
Dec. 31	Report to the Treasury Department of progress made under the superintendence of Alexander D. Bache, in the construction and distribution of standards of weights and measures, and supply of hydrometers to custom houses: also of balances made and distributed to the States, and the laws severally enacted therein relative to standard weights and measures from the 1st of January, 1848, to the 31st of December, 1856. Six illustrations. [Senate Ex. Doc. No. 27, Thirty-fourth Congress, third session.]	218, octavo.

Bibliography (1790 to 1896)—Continued.

Date.	Subject.	Number of pages and size.
1858.		
Dec. 15 ...	Report of the Secretary of the Treasury, communicating, in answer to a resolution of the Senate, a report showing the amount expended and the progress made in the Coast Survey, and also (pp. 222–287) the weights and measures furnished the several States and custom-houses and their cost. [Senate Ex. Doc. No. 6, Thirty-fifth Congress, second session.]	
1866.		
May 17	Mr. Kasson, from the Committee on Coinage, Weights, and Measures, made a report upon the general subject of a uniform system of coinage, weights, and measures, accompanied by bills and resolutions which, as acts of Congress, were approved July 28, 1866. [House Report No. 62, Thirty-ninth Congress, first session.]	
1867.		
Mar. 7	Letter of the vice-president of the National Academy of Sciences, communicating, in obedience to law, a report of the proceedings of the Academy during the year 1866. Report on hydrometers, densities, and Manual for Inspectors of Spirits, etc. [Senate Mis. Doc. No. 44, Fortieth Congress, first session.]	
1869.		
Nov. 15 ...	Report of Benjamin Peirce, Superintendent of Standard Weights and Measures, to the Secretary of the Treasury, upon the progress made in the construction of metric standards of length, weight, and capacity, in pursuance of a joint resolution of Congress of July 27, 1866.	4, octavo.
1871.		
Nov. 30	Report of an examination of weights and balances at the branch mint, United States, San Francisco, Cal.—by George Davidson, Assistant, U. S. Coast Survey.	
1875.		
Aug. 17	Memorial to Congress in favor of an International Bureau of Weights and Measures. Signed by F. A. P. Barnard, chairman committee; J. E. Hilgard, H. A. Newton, J. L. Smith, Joseph Henry, W. B. Rogers, Benj. Pierce, E. B. Elliott.	
1876		
Mar.....	Report on the proposed International Bureau of Weights and Measures at Paris. Giving a concise history of what has been done by the international conference—by J. E. Hilgard, Assistant, U. S. Coast Survey, and delegate from the United States to the International Commission.	
Mar. 1	Papers relating to metric standards distributed to the States of the Union under a joint resolution of Congress of July 27, 1866, including a description of the metric standards, with directions for their use—by J. E. Hilgard, Inspectors U. S. Standard Weights and Measures.	6, octavo.
	The relation of the lawful standards of measure of the United States to those of Great Britain and France—J. E. Hilgard. [Published as Appendix No. 22 to U. S. Coast Survey Report for 1876.]	5, quarto.
1877.		
.....	Comparison of American and British standard yards—J. E. Hilgard..... [Published as Appendix No. 12 to U. S. Coast Survey Report for 1877.]	33, quarto.
1878.		
Mar. 21, 23, 28.	Letters of C. P. Patterson, Superintendent Coast Survey, and of J. E. Hilgard, Assistant Coast Survey and Inspector U. S. Standard Weights and Measures, in relation to the proposition for making the use of the metrical system of weights and measures obligatory in all governmental and individual transactions, embodied, with other statements, in a communication from the Secretary of the Treasury, in response to a resolution of the House of Representatives.	7, octavo.
	[House Ex. Doc. No. 71, Forty-fifth Congress, second session.].....	37, octavo.
May 8, 18 ..	Statement of J. E. Hilgard, Inspector United States Weights and Measures, before the Committee on Coinage, Weights, and Measures, of the House of Representatives, concerning the standard weights and measures of the United States. [House Mis. Doc. No. 61, Forty-fifth Congress, second session.]	12, octavo.
June 11	International Bureau of Weights and Measures. Message from the President of the United States transmitting a communication from the Secretary of State in response to a resolution of the House of Representatives, in relation to the convention for establishing an International Bureau of Weights and Measures [House Ex. Doc. No. 96, Forty-fifth Congress, second session.]	
1880.		
Feb. 12.....	Report by Mr. Stephens, of Committee on Coinage, Weights, and Measures, on the metric system of coinage. [House Report No. 203, Forty-sixth Congress, second session.]	

Bibliography (1790 to 1896)—Concluded.

Date.	Subject.	Number of pages and size.
Mar. 5.....	Report of Mr. Vance, of Committee on Coinage, Weights, and Measures, on a decimal system of weights and measures for the English-speaking nations. [House Mis. Doc. No. 29, Forty-sixth Congress, second session.]	
1881.		
Mar. 3.....	Complete set of standard weights and measures to be furnished for the use of the agricultural colleges. Approved March 3, 1881. [Public resolution No. 23.] Joint resolution directing the Secretary of the Treasury to cause a complete set of all the weights and measures adopted as standards to be delivered to the governor of each State in the Union for the use of agricultural colleges, etc.	
1886.		
Jan. 29.....	Letter from the Secretary of the Treasury, transmitting letter from the Superintendent of the Coast and Geodetic Survey, relative to supplying balances, weights, and measures to Territories, etc. [Senate Ex. Doc. No. 55, Forty-ninth Congress, first session.]	
1888.		
Apr. 26	Letter from the Secretary of the Treasury, transmitting an estimate from the Secretary of State of an appropriation to supply deficit for the International Bureau of Weights and Measures. [House Ex. Doc. No. 283, Fiftieth Congress, first session.]	
1889.		
June 15	Bulletin No. 9.—On the relation of the yard to the metre. By O. H. Tittmann, assistant.	6, quarto.
	Appendix No. 6.—Annual Report of the U. S. Coast and Geodetic Survey, 1889. The relation between the metric standards of length of the U. S. Coast and Geodetic Survey and the U. S. Lake Survey.	19, quarto.
Sept. 16....	Letter to the Secretary of State, transmitting a report upon the subject of weights and measures for the information of the United States delegates to the International American Congress—by T. C. Mendenhall, Superintendent U. S. Coast and Geodetic Survey, and of Weights and Measures.	7, large octavo.
1890.		
Jan. 15.....	International American Conference. Report of the Committee on Weights and Measures, as adopted by the conference.	7, large octavo.
January	U. S. Coast and Geodetic Survey. Office of Standard Weights and Measures. T. C. Mendenhall, Superintendent. Tables for converting United States weights and measures, metric and customary.	2, quarto.
	Appendix No. 16.—1890. On the relation of the yard to the metre.....	6, quarto.
	[Republication, with additions, by Assistant O. H. Tittmann, of his paper first published as Bulletin No. 15.]	
May 6.....	Appendix No. 18.—1890. Historical account of United States standards of weights and measures, customary and metric; of the inception and construction of the national prototypes of the metre and kilogramme of their transportation from Paris to Washington; of their official opening and certification, and of their deposit in the Office of Weights and Measures. (One illustration.) Compiled by O. H. Tittmann, assistant in charge of the Office of Standard Weights and Measures. Brief account of the weights and measures in customary use in the United States, with the legislation relating thereto; customary length measure; customary standard of weight; capacity measures; weights and measures for agricultural colleges; metric standards; coefficient of expansion of the metre bars; construction of the kilogrammes; report of Dr. B. A. Gould, delegate from the United States to the International Conference of Weights and Measures, held at Paris, September, 1889; prototypes of the standard metre and kilogramme of the Bureau International des Poids et Mesures; report of Assistant George Davidson upon delivering one set of these prototypes to Prof. T. C. Mendenhall, Superintendent U. S. Coast and Geodetic Survey, and of Weights and Measures; certificate of President Benjamin Harrison in relation to the opening of the national prototypes of the metre and kilogramme; report of Assistant O. H. Tittmann upon the transportation of national prototype metre, No. 21, and national prototype kilogramme, No. 4, from Paris to Washington; descriptions and certificates of these prototypes.	24, quarto.
1893.		
Apr. 5 ..... (Part 2.)	Appendix No. 6.—1893. Fundamental Standards of Length and Mass. By T. C. Mendenhall. Note.—This paper was first published as Bulletin No. 26, and is republished here to give it a more permanent form. Appended to it will be found a third edition of the table for converting customary and metric weights and measures.	8, octavo.
(Part 2.)	Appendix No. 7.—1893. Units of Electrical Measure. By T. C. Mendenhall, approved by J. G. Carlisle, Secretary of the Treasury. Approved for publication December 27, 1893. Published as Bulletin No. 30.	4, octavo.

See also the excellent reports by the Hon. Charles W. Stone, of Pennsylvania, chairman of the Committee on Coinage, Weights, and Measures, Fifty-fourth and Fifty-fifth Congresses.

Mr. Sheppard moved to accept the report, and that its recommendations be approved, and the motion was adopted.

Mr. Ebert read the report of Delegates to the National Wholesale Druggists' Association as follows:

REPORT OF THE DELEGATION TO THE MEETING OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

To the Officers and Members of the American Pharmaceutical Association:

The undersigned delegates had the pleasure of attending the annual meeting of the National Wholesale Druggists' Association, which was held September 17th to 22nd, 1900, in the city of Chicago.

They respectfully report that they were kindly received and duly accredited as delegates and in this capacity extended in your name to this sister organization a most cordial fraternal greeting and your best wishes for their welfare. We also told them that the American Pharmaceutical Association was ever ready to assist in work for the betterment of the general drug trade.

In response we were told that they, the National Wholesale Druggists' Association, were proud of the relation subsisting between the two organizations and proud of your friendship; and that they recognized the mutuality of interests which the American Pharmaceutical Association so thoroughly and so well represented by its professional labors for the common good of all branches of the profession, and that you could rely on the continuance of their fellow feeling and hearty co-operation in all of your undertakings and efforts in this direction for the future as in the past.

Respectfully submitted,

ALBERT E. EBERT, *Chairman*,
PAUL G. SCHUH,
HENRY BIROTH,
ROBERT M. DADD,
THOS. LAYTON.

Mr. Searby moved to receive and adopt as read, which motion was seconded by Mr. Kennedy and carried.

The report of Delegates to the National Association of Retail Druggists was read by the Secretary, in the absence of Mr. Hall, Chairman:

REPORT OF THE DELEGATION TO THE MEETING OF THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

Gentlemen: Your committee would report, first, good sectional representation; second, enthusiasm; third, business; and lastly, enthusiasm. The section east of the Mississippi was well represented, and west fairly so. Ohio took the banner for numbers from a single outside organization, there being fifty from the Northern Ohio Druggists' Association; Western Pennsylvania Retail Druggists' Association came next, following with a delegation of more than thirty. New York, Massachusetts, Connecticut, Illinois, Minnesota, Kansas, Indiana, Tennessee, Kentucky, all had strong delegations, and in fact it was quite apparent that the convention was strictly a delegate body, and they were there for business and meant it too. If there is one motto of the National Association of Retail Druggists, it is, "Work, first, last and all the time." A spirit of loyalty to the Association and each other, and be willing to sacrifice something of their own for the others, good. A long pull, a strong pull, and a pull altogether.

Your delegates in responding, assured the convention of the backing of the American Pharmaceutical Association, and called attention to the epitome of National Formulary, of which the Secretary had forwarded to him fifty copies, and urged upon them to give the booklet their careful attention and put as many as possible in physicians' hands. The fifty copies were distributed personally by the committee as nearly geographically as possible, and we have sent the Secretary a nearly complete list of those to whom they were given.

Mr. E. C. Dewitt, representing the Proprietors' Association, said, "We find that when prices are cut it results not only in disadvantage to the retail druggist, but as well to the proprietor," and he stated, and his position was acquiesced in by other proprietors present, that he should hereafter make it a condition in execution of advertising contracts that the papers must not advertise his preparations at less prices than he himself charges, under pain of cancellation of contract.

Local organization seemed to be the keynote, with the parent organization acting as a helper and advisor. Let by gones be by-gones, make clean slate and all pull together if possible, on a compromise if necessary.

The Minneapolis plan was favorably commented on after being explained by Mr. Vogeli.

Briefly, there is a slight differential in favor of the cutter who is to stop advertising the proprietary preparations at cut prices. Such differential is not to exceed in any case four cents under the drug schedule. Mr. Vogeli said the practical operation of the plan reduced the sale of proprietaries 50 per cent. with the cutters, and a corresponding increase in regular drug channels, but as the cutter made a much higher percentage and more money under the new arrangement, he was satisfied as well as the retail druggist.

The question presented to each local association, "Will your members individually and collectively stand behind the National Executive Committee?" was again brought out in one of the reports.

As you all doubtless know, the selection by the N. W. D. A. of Mr. Holliday to act as assistant chairman of the Proprietary Medicine Committee, and whose duties would be to personally see individual proprietors and win them over to our cause, was an exceptionally happy one, Mr. Holliday being at the same time chairman of the Executive Committee of the N. A. R. D.

A list of the manufacturers who had agreed to the tripartite plan was given, and each manufacturer acting individually sent the following communication to the jobbing trade:

"Believing that the sale of our goods to aggressive cutters and brokers is detrimental not only to our business but to that of the retail trade as well, we will decline to sell our preparations to any party supplying such cutters or brokers, either directly or indirectly, with our goods at any price.

"Should complaints reach us that parties violate these terms, or we have reason to believe that they have done so, we shall exercise our right, whenever we are satisfied that these terms have been violated, to decline the orders of parties who have failed to maintain them. The above conditions are imperative, and the violation of them will be regarded as an abandonment of the rebate plan by any parties who have been acting as our wholesale distributing agents."

On the part of the retailer, he is to pledge himself not to substitute any other preparation whenever a proprietary medicine is called for, but to supply, without argument, the article demanded.

The representatives of the wholesale trade and the Proprietors' Association pledged themselves to abide the action of the National Association of Retail Druggists in convention assembled, and the wholesale trade will refuse to sell any party whenever seventy-five per cent. of the retail trade declares such parties to be aggressive cutters, and requests the wholesalers not to supply them.

The Committee on Pharmacy Laws declared in favor of a higher education, at least a high school one, on the part of those who wanted to learn the drug business; a strong upright personnel of the members of the State Pharmacy Boards, and an organization of the various boards so as to have a meeting at the same time and place as the National Association of Retail Druggists.

As one listened to the reports and discussions and marked the exceedingly earnest spirit prevailing, noting the character of the members as shown by their actions and words, he could come to no other conclusion than that every organization had sent strong men to represent them, and all were there for clear, earnest, intelligent and business purposes. Such a convention could not fail to awaken enthusiasm, and especially when "by their fruits ye shall know them."

Your committee thank you for the honor of being present as your representatives, and hope they may have brought you back some of the business points and enthusiasm there prevailing.

WM. A. HALL, *Chairman*,
EUGENE R. SELZER,
W. L. CLIFFE,
JAMES VERNOR.

Mr. Hynson moved to refer to the Section on Commercial Interests, and the motion prevailed.

The report of delegates to the Section on Materia Medica, Pharmacy and Therapeutics of the American Medical Association (for 1900) was read by Mr. Lyons.

REPORT OF DELEGATES TO MEETING OF AMERICAN MEDICAL ASSOCIATION, 1900.

The duty assigned to me and my associates appointed to represent the American Pharmaceutical Association at the Atlantic City meeting of the Section on Materia Medica, Therapeutics and Pharmacy of the American Medical Association, proved a most agreeable one. Four of our delegates were present, Prof. Remington, Dr. Bartley, Mr. Williams and myself.

We were received most cordially by the officers of the Section, and made to feel that as representatives of the profession of pharmacy we were welcome visitors. We were given the privilege of taking part in the discussions, and I must say that we found ourselves very much at home among the doctors. More than once we were appealed to for authoritative information in regard to matters belonging to our especial province of medicine, which was evidently assumed to embrace everything pertaining to a scientific acquaintance with drugs.

Prof. Remington was called upon for an account of the convention then recently held for the Revision of the U. S. Pharmacopœia, and was listened to with evident interest.

The special mission that had been entrusted to our delegation was the distribution to members of the Association of 500 copies of the Epitome of the National Formulary. In this we had the cordial coöperation not only of the officers of the Section on Materia Medica, Therapeutics and Pharmacy, but of other prominent men in the Association. I felt under particular personal obligation to Dr. Atwater, who was for many years General Secretary of the Association, and whose acquaintance among the physicians in attendance was therefore very wide. He recognized at once the value of the Epitome, and asked to have copies left with him at the registration office for distribution. He reported that after his supply was exhausted, he had many applications for copies from physicians who had heard that he had them for distribution. Whenever it was possible to explain to a physician the scope and aim of the National Formulary, his interest would

be at once engaged. Naturally, where so much "literature" was being pressed upon the doctors, they were disposed to look upon this as some advertising dodge and refuse offhand to even look at the booklet, but it was generally possible to get in a word about the permanent value of the little volume, and how it came from the American Pharmaceutical Association acting in the interests of legitimate pharmacy, which would take away the stony look from their faces and often lead to a pleasant chat. Few seemed to have heard anything about the National Formulary, and even of those who professed to be familiar with it few seemed unwilling to accept a copy of the Epitome.

The question of the admission into the Journal of the Association of advertisements of questionable character came up for discussion and brought out strong expressions of the feeling that the medical profession could have nothing to do with secret nostrums under whatever plausible disguise they might be offered.

It seems to me most important that the friendly relations that have been established between the two national organizations which represent respectively medicine and pharmacy, should be sedulously cultivated, and that to this end we should see to it that our Association is represented always by a strong delegation in the meetings of the Section on Materia Medica, Therapeutics and Pharmacy of the American Medical Association.

Respectfully submitted, A. B. LYONS, *Chairman.*

MR. LYONS: As evidence of what has been accomplished already by the sending of delegates to the meetings of the American Medical Association, I simply recite the circumstance that as a result no doubt of my presence at the Atlantic City meeting as a delegate, it became my privilege and pleasure at the meeting at St. Paul this year, as a member of the Nominating Committee, to name as Secretary of the Section on Materia Medica a delegate from this Association, Mr. Hallberg, who was accordingly elected; while as a result, I suppose, of my being a delegate from this Association, I was elected to the Council of the American Medical Association, a large body of seventy-five men who transact practically all the important business of the Association.

The Chair announced that, without objection, the report would be received and referred for publication, and it was so ordered.

THE PRESIDENT: We ought to have another report of the same kind from delegates to the American Medical Association for 1901. The chairman of the committee is not present, but I believe Mr. Hallberg was there, and I will ask him to speak for the committee.*

Mr. HALLBERG: I would briefly state the observations I made up there. I discovered for one thing that the American Medical Association, in practically three days' work, accomplish ten times the amount of work that this Association does in six days. Amount —of course I do not draw a comparison as to quality. I believe we ought to consider the possibility of a method of change in our present system. As you probably know, the twelve Sections of that Association run concurrently, and not consecutively, and that enables them to accomplish this vast amount of work. Aside from the president's address, there were about twelve general addresses made. There were three orations delivered, and about six hundred papers read—mostly, of course, in synopsis—and there were four large banquets held, at which probably the most desirable points concerning the relations of these medical men and the various sciences were considered under the most favorable conditions. The doctors seemed to be in a great hurry to get away. In many instances, two days was as much as they could spend at the meeting. Now, I think

* Mr. F. J. Wulling, the Chairman, has promised to send in a written report, which will appear further on.—The Gen'l Secretary.

possibly the reason we do not have as large an attendance as we would like may be due to the fact that our meetings have so much extraneous matter interwoven with them that many feel that they cannot spare the time required to attend these meetings. An entire week for the meeting and two or three days coming and going for those who live at a distance is a longer time than the average druggist can take to attend a meeting. It seems to me that if we would concentrate a little, and have some of this sectional work go on concurrently, it might help materially.

Another thing: The entire program in detail is published before the meetings of the American Medical Association. Every address, every paper with a synopsis of its contents, before it comes up to be read and discussed, is put into the hands of the members. The result is, that the members can flit about, so to speak, from one Section to another, and each one can make a sort of little itinerary of those particular subjects he is interested in, and he practically does not miss anything, and can take in everything of interest to him in these two or three days.

In conclusion let me say, that if there is any place where pharmacy is needed, it is in the American Medical Association.

MR. SEARBY: Mr. Hallberg has referred to the amount of business disposed of by the American Medical Association in so short a time, contrasting it with the work done by this Association, rather to our detriment. Now, there are two sides to this proposition. On one occasion, not many years ago, I was a delegate from this body to that Association, and I had a good opportunity of seeing the evils of the concurrent transaction of business by different Sections. I remember on one occasion when the Materia Medica and Pharmacy Section was to meet—which Section it was my duty to attend as the representative of this Association before that body—there was some important meeting going on in the Section on Surgery. Now, you must remember in the West there are very few things that physicians care about except surgery and bacteriology. Materia medica they take no interest in, and they are deficient in their knowledge of it. Their interest is small, as compared with their interest in surgery. On this occasion there were over two hundred people in the room where surgery was being discussed—a large number. In the room where materia medica and pharmacy were discussed there were not ten persons besides the readers of the papers. I was one of them, and two other gentlemen who read papers were present. It is a farce for us to send a representative to a body like that. They simply listen to the papers without discussing them, and adjourn. No good was done by this Association being represented under these conditions. It was foolish to send a man there. So let us not be in too great a hurry to adopt the methods of the American Medical Association. It is better for our members to be interested in practical pharmacy—commercial pharmacy, and the scientific side of the profession as well. Let us take a little more time and do things right.

MR. BARTELLS: I think the druggists of the country would be more benefited in attending these conventions if such a thing were done as Mr. Hallberg speaks of being done at the meetings of the American Medical Association—especially those from the villages and smaller towns of the land; they do not have the advantages of the city druggist. I mean addresses of interest and educational value; and I hope that sometime in the future our meetings will be favored with something of that kind. At the meeting in Baltimore, for instance, there was nothing more enjoyable than the lecture given by Prof. Simon on liquid air, and the illustrations he gave. Let us have something of that character at our meetings, instead of having to go to the theatre or some other place. It would be a good thing for us, and I hope we may have some such addresses by competent men.

MR HYNSON: I move that the three gentlemen last speaking be requested to submit their views and recommendations to the Committee on Welfare of the Association.

The motion was seconded and carried.

The report of the Committee on Time and Place of Next Meeting was called for, and Mr. Mayo read the report as follows:

REPORT OF THE COMMITTEE ON TIME AND PLACE OF MEETING.

Your committee beg leave to report that invitations have been received to hold the annual meeting of the Association for 1902 in Detroit, at Atlantic City, at Put-in-Bay and at Philadelphia, and recommend that the Association meet at Philadelphia, not earlier than the first of September, 1902, leaving the day for convening the meeting to the Council. The committee recommend that the Secretary be instructed to respectfully decline the other invitations received for the year.

Your committee also received a formal invitation to hold the annual meeting for 1903 at South Bend, Indiana, and a verbal invitation to meet that year at Hot Springs, Ark. Since final action cannot be taken on these invitations this year, the committee respectfully refer them to the meeting of 1903 for consideration.

Respectfully submitted,

W. S. THOMPSON,
W. L. DEWOODY,
CHARLES E. DOHME.
GEORGE C. BARTELLS,
CASWELL A. MAYO.

MR. ELIEL: I would like to say something to the Association in regard to the formal invitation which I presented to the Committee on Time and Place of Next Meeting from the city of South Bend, Indiana, to the American Pharmaceutical Association. This formal invitation comes from the citizens of South Bend—the mayor, the common council, and the more prominent citizens of the place. One reason why I, as a member of the American Pharmaceutical Association, ask this Association to consider this invitation if possible is this: South Bend is located—though perhaps a great many of you don't know it—in the extreme northern part of the State—North Bend being in the southern part of the State. [Laughter.] We have a dense population and a large number of large towns and cities within easy reach. So far as access is concerned, there is no city in the United States having better facilities for getting in—and, if you please, for getting out, if you don't like it. [Laughter.] If this Association is an association for the benefit and elevation of pharmacists, I know of no section of this country that is more entitled to have this meeting at that time than the city of South Bend, for the simple reason that there is a very small membership in this Association from northern Indiana, southern Michigan, northeastern Illinois or southwestern Wisconsin, outside the cities—Milwaukee, Chicago, Detroit, Cleveland, Toledo and Columbus, which are not very far distant. Another thing, we are as near the geographical center of population in the United States as it is possible to get, unless you meet in Indianapolis, where you met in 1879, since which time there has been no meeting within the limits of the State.

South Bend is a city of a little less than half a hundred thousand. Some of you may think we will not be capable of taking care of you, but we have hotel facilities second to those of no city in the United States. I except no city, from New York to San Francisco. So far as entertaining you is concerned, you need have no fear on that score. We have royally entertained associations which in attendance exceeded anything I have ever seen at the meetings of the American Pharmaceutical Association. I believe we can take care of you in as handsome a manner as any large city in the Union.

Another thing in favor of South Bend is this: Last year the Association met in the extreme East—Richmond, Virginia. This year we are meeting in a large city in the West—Southwest, rather, so far as the center of population is concerned. Next year we meet in the extreme East again—Philadelphia. We will have met three years in suc-

cession in large cities. Now, it has been the policy of the Association to alternate between large cities and a resort, generally. South Bend is not a resort town, it is true, but a busy business city; but in a small place like South Bend you can get together and keep together. There are not so many distractions. I believe you can have as profitable and enjoyable and well-attended a meeting there as in any place in the United States, and I am certain there will be a large accession of members from northern Indiana, Michigan, Illinois and Wisconsin, especially—a very desirable thing for the Association.

So I desire the Association to give the matter of meeting in South Bend, Indiana, in 1903, its most careful consideration. I would like for the members to think well over the points in its favor I have made.

THE VICE-PRESIDENT: The invitation of Mr. Eliel will be received with thanks, there being no objection, and referred to the next Committee on Time and Place of Meeting.

MR. KREMERS: When Mr. Ryan made his report, I think some of us got the idea that his committee would be discontinued and merged into the Committee on National Legislation. I think that would be a great pity, because the work Prof. Ryan has been doing has been most efficient, and can only be done by a special committee of that kind. If this view that the committee is to be discharged is correct, I move to reconsider the action taken, so that the committee will not be discontinued.

THE VICE-PRESIDENT: I do not think any such motion was made, and Mr. Ryan only referred to it as a presumption, I believe.

MR. RYAN: If you will notice the wording of Mr. Ebert's recommendation in the report of the Committee on National Legislation, it was to the effect that the committee shall consist of three members, the chairman to be a resident of Washington City, the committee to give their consideration to all matters of national legislation. Now, the Committee on Weights and Measures was originally and primarily appointed to use its best efforts to have the Congress of the United States adopt as the legal standard of weights and measures the metric system. It specifically states that we are to use our influence with Congress to bring this object to a final conclusion. Mr. Ebert's recommendation was passed unanimously here, and it struck me there was no further use for the Committee on Weights and Measures, as hereafter the Committee on National Legislation would take up all these matters. But I have not given the matter enough thought, possibly to state definitely that this is the effect of it; it seemed so to me.

MR. GOOD: If it is concluded to leave it that way, a suggestion that Mr. Ryan be made a member of that committee would simplify matters. His work would certainly be needed there.

MR. THOMPSON: There is a misapprehension on the part of Mr. Ryan as to the duties of this committee. Mr. Ebert's resolution only reduced the old committee and provided that the chairman should be a resident of Washington. The Committee on National Legislation is a committee to look after such legislation as comes before Congress as may affect the interests of this Association. Mr. Ryan's committee is one created for a specific purpose—to have the metric system of weights and measures made the legal system of weights and measures for this country. The legislative part of it is merely incident to that; it is not the chief thing. He does his work outside of Congress—perhaps altogether. The means employed are entirely different from those employed by the Committee on National Legislation. There is no conflict of work or power. They are just as different as they have been all along.

THE VICE-PRESIDENT: In the opinion of the chair, Mr. Thompson has stated the

matter correctly. It is my opinion that the Committee on Weights and Measures could not be considered as abolished unless it was done by action as formal and well-considered as the action which created it.

MR. SHEPPARD: There is another fact in connection with this matter we ought to consider. In all these years the committee has been traveling a very dark and rocky road, but it seems as if the sunrise was nearly in sight and that they could now do their best work, when we are in the very heat of the conflict, and definite action is likely to be taken. We need the committee now for this specific purpose, and it should not be abolished.

MR. GOOD: I would call for the reading of the recommendation in the report presented by Mr. Ebert. Mr. Ryan has evidently been under the same impression that I myself have been, that all these matters were referred to the Committee on National Legislation.

The Secretary read the paragraph in question, as follows:

"In conclusion, we desire to suggest that this committee be made permanent; that its membership be reduced to the original number of three members; that the chairman be selected from the City of Washington and the other two members selected one each from the two largest cities in the country; and finally, that all matters relating to pharmacy depending upon Congressional action for their successful achievement be committed into the charge of this committee."

MR. SEARBY: As interpreting the action of the Association in adopting this recommendation, I move that the Committee on Weights and Measures, of which Mr. Ryan has been chairman, be continued.

Mr. Sheppard seconded the motion.

THE VICE-PRESIDENT: It has been moved and seconded, that it is the sense of this Association that the Committee on Weights and Measures be continued as before. The Chair has some doubts as to the propriety of this motion.

MR. KREMERS: I move as a substitute that the action of the Association upon the recommendation of the Committee on National Legislation be so construed as not to interfere with the existence or labors of the Committee on Weights and Measures.

And the motion was so put and carried.

Upon motion of Mr. Kremers, the Association then adjourned.

THIRD SESSION—TUESDAY AFTERNOON, SEPT. 17, 1901.

No business was transacted by the Association previous to the session of the Section on Commercial Interests.

FOURTH SESSION—WEDNESDAY MORNING, SEPT. 18, 1901.

The fourth general session, devoted to the discussion of exhibits, was called to order at 10:15 a. m., President Patton in the chair.

The Secretary suggested that the reading of the minutes of the second

and third general sessions be dispensed with at this session, as it was more especially designed for hearing the remarks of the various exhibitors by their representatives, and upon motion of Mr. Dohme, it was so ordered.

Mr. Kennedy read the minutes of the third session of the Council, held this morning:

SIXTH SESSION OF THE COUNCIL—SEPTEMBER 18, 1901.

Chairman Thompson called the Council together at 9:30 o'clock a. m., with the following members present: Messrs. Beal, Caspari, Diehl, Dohme, Good, Hynson, Kennedy, Oldberg, Patton and Sheppard.

The Secretary presented the names of twenty-one (21) applicants for membership, making a total of 143. On motion, they were directed to take the usual course of being presented to the Association.

On motion, Council adjourned to meet Friday, September 20th.

GEO. W. KENNEDY, *Secretary.*

Upon motion of Mr. Hancock, the minutes of the Council were adopted as read.

Mr. Kennedy read an additional list of 21 names presented for membership, making a total of 143 to date, of which 120 had paid their dues.

The chair announced that the list would take the usual course.

The President stated that there was one man who had done more than any other to promote the exhibit now about to be discussed, and he proposed to call him to the chair to preside. He said he referred to Mr. Joseph P. Remington, of Philadelphia.

Mr. Remington in taking the chair said that speeches would be limited to five minutes, and stated that the exhibit was instituted for a special purpose—that many of the older members had thought it was a mistake to discontinue these annual exhibits, and they were now revived because the Association felt the need of this feature of its annual meetings. He said that everything objectionable had been eliminated, and would continue to be so, and that all those having something of interest and value to bring before the pharmacists of the country would find here the proper arena for its exhibition before the representative men of the profession, whether the exhibitor desired merely to exhibit it for the benefit of his fellows or desired to sell it. He further stated that no other organization had such a high-class exhibition feature, and he desired to thank those who had contributed towards bringing about this result, as well as those in attendance who thus by their presence lent encouragement to the project. Finally, he thought it proper that the Association should control and be responsible for any exhibition conducted under its auspices, so as to insure that high standard so much to be desired in matters of this kind.

Mr. Bond here arose to read a telegram of invitation to this Association from the Arkansas State Association, by its president, Mr. Appleton, to meet at Hot Springs in 1903. Mr. Bond assured the Association of a cordial Southern welcome if it would come, said there were no anarchists

in his State, and expressed his thanks to the members and officers of the Association for the generous greeting accorded him after a long absence from the annual meetings. He said he loved them all, and though he could not be present all the time, he would always come when he could. [Applause.]

On motion of Mr. Kennedy, the invitation from Arkansas was referred to the Committee on Time and Place of Meeting for 1903.

The first speaker on exhibits was Mr. H. G. Gray, representing the American Soda Fountain Company. Mr. Gray said that his company, composed of five of the best known soda-fountain houses in the world, was not only a large manufacturer of soda-fountains, but of bottling and carbonating machines as well. He said that his company, through one or more of the concerns composing it, had been in the business for seventy-five years, and that nearly every druggist in the land who had a soda-fountain at all had one made by one of these plants. He invited an inspection of the company's exhibit in the exhibition-room downstairs, and extended a cordial invitation to visit its show-room and depository on St. Charles street, in this city, where the members would be shown every attention and have explained to them any point about their business that might be desired.

The Appert Glass Company was represented by Mr. S. T. Chrissy, who called attention to the display of his company and the manifold uses to which its jars and tanks could be put. He said that pharmacists and chemists had complained that they could not obtain hollow vessels of glass of large capacity, and that those now offered by his company, ranging in size up to fifty gallons, would meet this demand; that it offered a glass vessel chemically inert, unaffected by climatic change, of unusual mechanical strength, and easily and quickly cleaned. He invited the members to read their printed matter and note the many uses suggested for this ware, which would probably suggest many other uses not named there.

The William S. Merrell Company, of Cincinnati, was represented by Mr. R. W. Proctor, who spoke as follows:

For the purpose of our exhibit, we have selected the products from the two sources, Hydrastis Canadensis and natural Oil of Wintergreen, as they are distinctly "Merrell" products, the late Wm. S. Merrell, through his early research, having done more than any other one investigator toward bringing these drugs into prominence. We consider the exhibit an exceedingly interesting one from a scientific view-point, and on the other hand are proud to *show* that our unceasing work on these products gives results which we confidently believe are unequaled.

Our list of chemical products from Hydrastis includes: Hydrastine—H. hydrochlorate, H. sulphate, H. citrate, H. tartrate; Berberine Acid Sulphate—B. neutral sulphate, B. hydrochlorate, B. phosphate, B. methyl sulphate, B. acetone.

The hydrastine and its salts are too well known to require any discussion. However, we exhibit the tartrate as a very fine salt for medicinal use. It is sufficiently soluble, and at the same time permanent in the air, while the hydrochlorate and sulphate are too hygroscopic to be of much value from a commercial standpoint.

During the past year we have resumed our research upon berberine, and our chemist, Dr. H. M. Gordin, has given us some very interesting results which will be given to this meeting. The point we wish to make, though, is that we present a berberine phosphate which is absolutely free from other salts, and you all know that up to this time there has been no such thing, except perhaps a sample made with great pains for experimental work. This is made from the acetone compound, of which you will find a sample. We also call your attention to a new undescribed compound of scientific interest, berberine methyl sulphate, which is beautifully crystalline.

Oil of Wintergreen Products: The Merrell Co. are the original American manufacturers of these products; starting with salicylic acid, to which they have added from time to time the salicylates of sodium, bismuth, ammonium, strontium, calcium and lithium, as well as xanol (sodium caffeine salicylate), gaultherin (sodium methyl salicylate), salamid (amido salicylic acid), iodozen (di-iodo-methyl salicylate).

The crystalline form of our salicylic acid is very beautiful and the crystals are firm. This is due to the absence of other creosotic acids, which are invariably present in the salicylic acid made from phenol, and prevent the synthetic acid from crystallizing in sharp, defined, large crystals.

Gaultherin, salamid and iodozen are made from the oil directly. Iodozen is, as its name implies, an iodine substitution product of oil of wintergreen, the iodine replacing two of the atoms of hydrogen in the benzene ring. It is used in surgery as a powerful antiseptic devoid of all toxic properties.

The next speaker was Mr. C. S. N. Hallberg, of Chicago, Chairman of the Sub-Committee No. X of the Revision U. S. Pharmacopœia, who presented a collective exhibit comprising cerates, ointments, plasters, etc.; about one hundred specimens contained in 4 oz. and 8 oz. screw-cap jars placed on a pyramid to display the variegated colors were shown together with some micrographs of the different degrees of subdivision of ointments of mercury and other compounds.

The object of this exhibit was to show the different results obtained through the different formulas which have been proposed from time to time as compared with the official formulas. Thus ten (10) specimens of zinc oxide ointments made with different vehicles; animal, vegetable and mineral fats, also lanolin, were contrasted.

Snow-white specimens of lead plaster made by precipitation, together with plasters made with rubber vehicle and stable mercuric oleate, were features of the exhibit.

Messrs. Rosengarten & Sons, of Philadelphia, were to have been represented by Mr. John Gleichman, but he was sick in bed. Mr. Remington volunteered to say a few words for this well-known old chemical house, and called particular attention to its display of alkaloids, choice chemicals and beautiful specimens of cinchona bark.

Mr. Frank G. Ryan spoke of the exhibit of Messrs. Parke, Davis & Company, of Detroit, as follows:

Adrenalin, the active blood-pressure-raising and hemostatic principle of the suprarenal or adrenal gland, is obtained in the form of a light yellow or nearly white micro-crystalline powder, melting under decomposition at about 194° C. The form of the crystals is influenced by the kind of solvent used as well as other factors: various forms have been

observed, viz.—wart, or tomato shape: boat shape; prism shape; fine needles; rhombic plates and their agglomerations; dumb-bell shape.

Adrenalin is practically insoluble in cold water, very sparingly in hot; it behaves similarly towards alcohol and acetone. Insoluble in ether and chloroform. It is very soluble in dilute acid, forming for the most part very hygroscopic non-crystallizable salts; the neutral sulphate has been, however, obtained in the form of needles arranged in bunches, and no doubt other salts can be obtained under the proper conditions.

Caustic alkalies dissolve adrenalin readily, the active principle being changed by this procedure. It is practically insoluble in very dilute ammonia or the alkaline carbonates; in an excess of a moderately strong solution it is soluble in both reagents, undergoing apparently same change as by the caustic alkalies.

The following reagents do not produce precipitates: picric acid; tannic acid; phosphomolybdic acid; phosphotungstic acid; mercuric potassium iodide; mercuric chloride; platinum chloride; potassium bi-chromate.

The following color reactions are given by dilute acid solutions of adrenalin or the powder:

Ferric chloride produces a green color which turns to cherry red on standing; the addition of alkali causes the change to take place very rapidly. Strong acids prevent the first part of the reaction, but not the latter.

Millon's reagent produces gradually in acid solution a cherry-red color similar to that produced with tyrosin—more pronounced, however, when the powder is used, and scarcely to be distinguished from that of tyrosin. The color fades, however, more rapidly than that produced by tyrosin.

An ammoniacal silver solution is reduced very energetically in the cold by adrenalin.

About 28 parts of sulphuric acid are required to neutralize 100 parts of the active principle (using cochineal as indicator). There is at least one hydroxyl group in adrenalin, possibly more, as it forms an acetyl derivative.

The exhibit of the Liquid Carbonic Acid Mf'g Company of onyx soda-water apparatus, with latest devices, including automatic charging apparatus, tilting jars, etc., was to have been explained by Mr. T. B. Rains, but the gentleman was not present.

Messrs. Sharp & Dohme, of Baltimore, were represented by Mr. J. F. Christian, who spoke of the time and labor expended by his company to make an attractive and instructive display. He directed particular attention to its display of the ground drug and its equivalent in its one or more derivatives—such as their golden seal, yielding six grains of hydrastine from three-quarters of a pound. Also to a liquid preparation of cascara sagrada, pleasing to the taste and very desirable. He also directed attention to the company's display of elegant tablets—hypodermic, tablet triturates, compressed and dispensing tablets. He exhibited a number of glass jars of tasteful design containing a unique display of tablets and pills handsomely and attractively arranged for effect.

Mr. C. M. Phelps spoke for the Horlick's Food Company. He directed attention to their productions of malted milk, Horlick's food and Horlick's diastoid, the malted milk being their chief product and intended more as a diluent or modifier of cow's milk, fresh. He spoke of the fact that malted milk had become a popular beverage in the home, at the clubs, cafes, etc., and invited attention to an equivalent on exhibition for dis-

pensing it at the soda-fountain, which the company offered complimentary to any druggist who desired to introduce it and serve it to his customers. The dispensing jars, filled, the mixers, shakers, and whatever material was necessary to start the pharmacist in business, would be sent free of expense to those desiring the outfit.

Mr. L. G. Blakeslee spoke for the Mallinckrodt Chemical Works. He called attention to the fact that his company was the pioneer in the west in the manufacture of morphine and other medicinal chemicals, and he spoke of the elegant display of morphine in the exhibition-room. Also, he directed attention to the company's display of sub-nitrate of bismuth, potassium iodide, cocaine, etc., and particularly to their line of pure granulated salts, prepared with the especial view of meeting the demands of the dispensing pharmacist. The exhibition feature of the Association was heartily approved by his firm.

The chairman said he regretted to have to say that the educational institutions had not responded to the invitation to take part in the exhibition with the alarcity that the manufacturing houses had, and that the large exhibit of books, relics and other things that he had hoped for from the colleges had only materialized in part.

The Massachusetts College of Pharmacy exhibit was displayed and explained by Mr. W. L. Scoville, who showed the audience a number of volumes, forming part of a collection of Pharmacopœias gathered from far and wide by Mr. S. A. D. Sheppard, at great trouble and expense, and known at the college as the Sheppard Library. Dr. Rice, the speaker said, had assisted in this work, and the complete library of 275 volumes represented nearly every civilized country. The volumes exhibited were of varying size, some of them very small, and some of almost priceless value. Mr. Sheppard has had red morocco covers or cases made for them, lettered in English, with the name of the country and date of publication, making them very attractive to the eye. The speaker said that one volume of the collection was an old Dutch work, printed in 1528, in Old Latin, still in a fine state of preservation, and pronounced by Dr. Rice the oldest Pharmacopœia of which he had any knowledge.

Mr. Sheppard asked permission to say a few words in regard to this collection, and told how the students at the college had passed these old Pharmacopœias by for several years, without notice, while standing on the shelves in their original covers, but began to inquire about them at once—as they had been all along about the library of botanies and works on chemistry—as soon as they appeared in the red morocco cases and were made attractive in appearance.

Mr. Lyman F. Kebler, for the Smith, Kline & French Company, of Philadelphia, called attention to his firm's exhibit of adulterated drugs as the chief feature of its exhibit, although the exhibit was supplemented by a few fine chemicals made by his house. These adulterated drugs were,

in the main, goods offered for sale to his house, and their spurious character proven by laboratory test and analysis. Mr. Kebler went into detail and described many of these adulterated drugs and chemicals by name, stating how and by what they were found to be adulterated—for example, he spoke of the adulteration of tannic acid, vanillin, oil of bergamot, oil of cassia, Japan wax, etc. In one case, where analytical test showed adulteration of the drug, the firm from which it had been obtained not only took it back and paid all charges, without saying a word, but paid in addition a $25 fee for the laboratory work that proved the adulteration.

Mr. Howard Goodwin spoke to the exhibit of the Mellin's Food Company and said:

Mellin's Food is a cereal extractive for the modification of fresh cows' milk, made in strict accordance with the formula of Baron Justus von Liebig, one of the most distinguished and highly honored physiological chemists of the nineteenth century.

It consists of the carbohydrates, maltose and dextrin, albuminoids and salts freely soluble, absolutely free from starch, cane sugar, glucose, or any other indigestible matter. When added to fresh cows' milk Mellin's Food so modifies the cows' milk as to make a food answering chemically and physiologically to the needs of an infant. No infant food has ever been invented by a reputable physiological chemist since Liebig's time, and no authority disputes the science of the Liebig formula, though it could be said that the extemporaneous preparation was rather difficult for the mother. Mellin's Food has made it possible for the mother to prepare this formula with the greatest ease and simplicity, and in a way that meets all its requirements.

Mellin's Food also furnishes the desired alkalinity, its salts consisting of those that largely predominate in human milk—potassium salts. In the ash of human milk the alkalinity depends upon the presence of potassium salts.

Another matter, and no doubt the most important of all in the science of infant feeding, is the digestibility of the casein of cows' milk. You all know what a tough tenacious curd we have in cows' milk, and how vastly different this is from what we find in human milk. Mellin's Food so acts upon the casein as to prevent this tough tenacious curd from forming, and thereby presenting this proteid matter in a soft flocculent condition easily acted upon by the digestive juices and remarkably similar in its character to human milk.

Messrs. Johnson & Johnson.—The Chairman explained that unfortunately the shipment of goods of this firm was delayed owing to the illness of Dr. Kilmer, the chemist of the firm and a well-known member of the Association, and that the local representative had been compelled to depend for his display on such of their goods as he could hurriedly obtain from the local jobbers.

The Meyer Brothers Drug Company was represented by Mr. J. W. Estes, who first invited the members to visit the house, only a very short distance from the hotel, and then called special attention to the firm's exhibit of powdered drugs, powdered spices, essential oils, vanilla beans, olive oil and various crude materials used in the manufacture of Imperial Crown Perfumes.

The exhibit of Messrs. E. R. Squibb & Sons was explained by Mr. J. Percy Remington, as follows:

E. R. Squibb & Sons exhibit a complete line of fluid extracts made with acetic acid and also of compound alum powder.

In regard to these fluid extracts it was found possible to extract the active principles of most of the drugs of the Pharmacopœia with acetic acid, in most cases as dilute as ten per cent. strength, and that reliable preparations representing the drugs cubic centimeter for gramme can be produced.

The exhaustion with this menstruum is remarkably complete, the marc or residue left in the percolators being entirely inert, and the resulting fluid extracts being stable and fairly free from sediment.

It is believed that the small quantity of acid left in these liquids (about six to eight per cent.), is not sufficient to interfere with the medicinal effect and is in most cases preferable to the large percentage of alcohol in the official fluid extracts.

The question of the expense saved by this process, although naturally the last that should be considered in dispensing medicinal preparations, is an interesting one. It may be stated roughly that five-sixths the cost of menstruum and one-third the cost of milling is saved, or in other words, that these fluid extracts can be made for about fifty cents a pound less than those made with an alcoholic menstruum.

In some cases they possess distinct advantages such as in digitalis, ergot and colchicum, which are fat-free, in gentian and cinchona, which do not contain those tannin-like bodies found in the alcoholic fluid extracts, in arnica, larkspur and the other drugs for external use they are more readily absorbed, and in wild cherry in which the hydrocyanic acid is quite stable.

They are, however, incompatible with the carbonates and alkalies, and cannot be used hypodermically, but they are compatible with the iodides, and do not precipitate much on dilution.

Compound alum powder, which was also shown, is composed of burnt alum, carbolic acid and camphor. It is intended as a styptic and antiseptic dry-dressing for wounds and sores, where the alum acts efficiently in stopping the bleeding, forming a scab, absorbing the secretions and protecting the wound, while the other two ingredients act as antiseptic, anaesthetic, deodorizing and healing agents.

Messrs. Merck & Company had as their representative Mr. A. W. Stewart, who briefly called attention to his firm's elaborate and handsome display of chemicals and drugs, and thanked the Association for the opportunity presented of making it.

Chairman Remington exhibited and explained the history of some old relics belonging to the Philadelphia College of Pharmacy that he had brought with him to this meeting. One thing was an old and very accurate (two) fluid-ounce measure made for Prof. Procter in 1860 by Dr. Wilson H. Pile, an old member of the Association, and used by the Pharmacopœial Committee of that year to standardize their pharmaceutical preparations. Also the original report (in two volumes) of the Committee of Revision of the U. S. Pharmacopœia of the Philadelphia College of Pharmacy, for 1840, in the handwriting of Prof. Procter, who was then a young man. Pharmacists up to that time had not been represented on the committee, but the doctors' Committee on Revision of the Pharmacopœia for that year, hearing this report was coming, held up their own until it was presented, and then practically adopted it as the Pharmacopœia for 1840, destroying their own report. He also exhibited a

primitive Chinese drug-mill, which had gone through the Revolutionary War and showed signs of many years' use. The manner of operating the mill was shown by the speaker.

Mr. Joseph W. England, who represented the H. K. Mulford Company, spoke as follows:

Gentlemen: I simply want to say a word or two with reference to a product that during the past ten years has, in its way, prevented as much human suffering and saved as many lives as those sheet-anchors of medical practice—morphine, quinine and strychnine. I refer to diphtheria antitoxin, the use of which is to-day the accepted treatment for diphtheria. Diphtheria antitoxin may be defined as a solution of certain principles that are antidotal to the poison excreted by the organism causing diptheria. It is prepared by a reaction in horses' tissues, between certain of its elements and diphtheria toxin free from bacteria, whereby an antitoxin is formed. It is standardized with guinea-pigs. The standard is a unit. A unit is that quantity of antitoxin that will save from death a standard-weight guinea-pig from 100 times its minimum fatal dose of diphtheria toxin. The action of antitoxin is to arrest destructive metabolism in the body and permit natural resources to effect a cure. The dose for immunization is from 500 to 1,000 units, and for cure from 2,000 to 10,000 units, doubled at the second injection if necessary.

Some idea of the worth of this remedy may be gathered from facts recently reported by Dr. W. W. Keen, of Philadelphia, that the use of antitoxin has reduced the death rate from diphtheria in Baltimore from 70 per cent. to 5 per cent., while in New York City 1,500 lives have been saved by its use in a single year.

Now, the retail druggist is the natural source of supply for this life-saving remedy, and in justice to himself and his customers he should sell only the best, and determine for himself which is the best by consulting with his physician-friends as to results had with the different makes on the market—the lives of his customers demand it.

Mr. F. L. Pope represented the St. Louis Granule Company, and called attention to their effervescing granular salts, made by a dry process original with the speaker, which he had successfully used for ten years past. He claimed this product to be a very superior article, and one which should commend itself to physicians and pharmacists, as it would last a lifetime, without turning yellow or deteriorating, and would always effervesce.

The Pittsburg College of Pharmacy was to have had a spokesman in Mr. Julius A. Koch, the Chairman said, but the gentleman was not present.

Prof. Albert Schneider, of the School of Pharmacy of the Northwestern University, Chicago, exhibited and described some 50 or 55 of his own pen and ink drawings, illustrating the important histological characteristics of certain powdered vegetable drugs he had been investigating, these drawings forming part of a series of about 150 that he proposed to make, which, together with the proper descriptive text, he said it was his purpose to publish in book form at a future date.

Mr. Gray, for Messrs. W. D. Hart & Brother, of Bradford, Pa., showed a simple and effective suppository machine put out by that firm, which they claim to be a perfect instrument for the purpose intended—especially suitable for prescription work because of the ease and rapidity with which it can be operated.

On motion, it was agreed that Mr. Kebler should be permitted to finish his remarks interrupted by the operation of the five-minute rule before the Scientific Section.

On motion of Mr. Lemberger, the Association then adjourned.

Fifth Session—Thursday Morning, Sept. 19, 1901.

The Association was called to order at 10 o'clock a. m., President Patton in the Chair.

The President: We have only a short amount of business to attend to this morning. I will call upon the Chairman of the Committee on Resolutions to report. This committee was appointed to express our sense of sorrow at the great calamity that has befallen the nation. I will ask Mr. Lowe to read the resolutions the Committee has prepared.

Mr. Lowe: Mr. President, I have the honor to report the following resolutions:

Whereas, the President of the United States has issued a proclamation saying:

"A terrible bereavement has befallen our people. The President of the United States has been struck down; a crime committed not only against the chief magistrate, but against every law-abiding and liberty-loving citizen.

"President McKinley crowned a life of largest love for his fellow-men, of most earnest endeavor for their welfare, by a death of Christian fortitude; and both the way in which he lived his life and the way in which, in the supreme hour of trial, he met his death, will remain forever a precious heritage of our people.

"It is meet that we, as a nation, express our abiding love and reverence for his life, our deep sorrow for his untimely death.

"Now, therefore, I, Theodore Roosevelt, President of the United States of America, do appoint Thursday next, September 19, the day on which the body of the dead President will be laid in its earthly resting place, as a day of mourning and prayer throughout the United States. I earnestly recommend all the people to assemble on that day in their respective places of divine worship, there to bow down in submission to the will of Almighty God, and to pay out of full hearts their homage of love and reverence to the great and good President whose death has smitten the nation with bitter grief. In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

"Done at the City of Washington the 14th day of September, A. D., 1901, and of the independence of the United States the one hundred and twenty-sixth.

(Seal.) "Theodore Roosevelt.

"By the President—John Hay, *Secretary of State.*"

Now, therefore, be it

Resolved, by the American Pharmaceutical Association, in annual session assembled, that its proceedings are hereby suspended and deferred until after the conclusion of this day of grief and prayer, that we may unite with the whole people in humble submission, reverently repeating the last words uttered by him who so resignedly and lovingly gave up his life in the faithful service of our country and of all of its inhabitants: "God's will, not ours, be done." Be it also

Resolved, That we tender our heart-felt sympathy to Mrs. McKinley, who during the life of her husband was the object of his most tender regard and care, and that while we mourn with her, we cannot forget that our late President still lives, that he has been but translated to a higher sphere. Be it finally

Resolved, That as loyal and law-abiding citizens of this great Republic of the United States of America, we hereby renew our allegiance to the government, and pledge our earnest endeavor to repress and stamp out both anarchy and anarchical sentiments, so that no dark shadow may ever in this way fall upon our country again.

Respectfully submitted,

CLEMENT B. LOWE,
OSCAR OLDBERG,
J. H. BEAL,
J. W. T. KNOX,
Committee.

Mr. Lowe explained that Mr. Brandenberger, of the committee, was not present at its sessions and could not be found, and, therefore, his signature could not be had.

THE PRESIDENT: I think we can all endorse these resolutions, and we will have a rising vote.

The resolutions were then adopted by a unanimous rising vote, taken amid impressive silence.

THE SECRETARY: I move that the Association do now adjourn, there being no other business before it.

Mr. Stedem seconded the motion and it was adopted.

SIXTH SESSION—THURSDAY EVENING, SEPT. 19, 1901.

No business was transacted by the Association previous to the first session of the Section on Scientific Papers.

SEVENTH SESSION—FRIDAY MORNING, SEPT. 20, 1901.

No business was transacted by the Association previous to the second session of the Section on Scientific Papers.

EIGHTH SESSION—FRIDAY AFTERNOON, SEPT. 20, 1901.

No business was transacted by the Association previous to the first session of the Section on Education and Legislation.

NINTH SESSION—FRIDAY EVENING, SEPT. 20, 1901.

No business was transacted by the Association previous to the second session of the Section on Education and Legislation.

TENTH SESSION—SATURDAY MORNING, SEPT. 21, 1901.

The Association was called to order by the President at 11 o'clock a. m.

The Secretary read the minutes of the second, fourth and fifth general sessions at which business was transacted.

The chair stated that, without objection, the minutes would stand approved as read, and it was so ordered.

Mr. Kennedy read the minutes of the several meetings of the Council held since adjournment of the last general session.

FIRST SESSION OF THE NEW COUNCIL—SEPTEMBER 20, 1901.

The Council met for re-organization at 2 o'clock p. m., the following members being present: Messrs. Beal, Dohme, Kennedy, Lowe, Payne, Rapelye, Thompson, Sheppard and Whelpley.

Temporary organization was effected by the election of Jas. H. Beal as Chairman and Geo. W. Kennedy as Secretary.

The first business in order being the election of officers for the ensuing year, Geo. W. Kennedy nominated Wm. S. Thompson for Chairman.

On motion, the nominations were closed and the Secretary, upon motion, cast an affirmative ballot for the nominee, whereupon Mr. Thompson was declared elected Chairman of the Council.

Chas. E. Dohme nominated A. B. Prescott for Vice-Chairman.

On motion of C. B. Lowe, the nominations were closed and the Secretary directed to cast an affirmative vote, which was complied with, and A. B. Prescott was declared elected.

S. A. D. Sheppard nominated Geo. W. Kennedy for Secretary. On motion, the nominations were closed and he was elected by the chairman casting an affirmative vote.

C. B. Lowe nominated the following gentlemen to constitute the Committee on Membership: Lewis C. Hopp, F. W. Meissner, Jas. H. Beal, Wm. M. Searby, Geo. F. Payne, E. G. Eberle, F. W. E. Stedem. On motion of Wm. S. Thompson, the Secretary was directed to cast an affirmative vote for the nominees, which was complied with, and the gentlemen were declared elected. The General Secretary and Treasurer of the Association are ex-officio members of the committee.

Wm. S. Thompson nominated Chas. E. Dohme, Chas. A. Rapelye and C. B. Lowe as members of the Committee on Finance. On motion, they were elected by the Secretary on affirmative ballot, as directed.

Wm. S. Thompson nominated the following gentlemen for members of the Committee on Publication: C. Lewis Diehl, Chas. Caspari, Jr., Leo Eliel, Wm. C. Alpers and Lyman F. Kebler. On motion of C. B. Lowe, the Secretary cast an affirmative ballot, electing the nominees.

The composition of the Committee on Centennial Fund is provided for in the by-laws of the Council. It consists, for the ensuing year, of H. M. Whelpley, Chas. E. Dohme and Chas. Caspari, Jr.

The chairman appointed the following members of the Auditing Committee: C. B. Lowe, chairman, Chas. W. Hancock, Wm. McIntyre.

W. S. Thompson nominated for the Committee on Transportation, A. E. Ebert, of Chicago; C. A. Mayo, of New York; S. A. D. Sheppard, of Boston; Chas. M. Ford, of Denver; Chas. G. Merrell, of Cincinnati; Geo. F. Payne, of Atlanta; H. M. Whelpley, of St. Louis; Wm. M. Searby, of San Francisco; Chas. T. Heller, of St. Paul; Max Samson, of New Orleans. On motion, the nominees were elected by the Secretary casting an affirmative ballot as directed. The General Secretary and the Local Secretary of the Association are also members of the Committee on Transportation, in accordance with Art x., Chap. ix., of the By-Laws.

On motion of G. W. Kennedy, the Council took a recess of five minutes for the purpose of giving the committees time to select their chairmen. At the expiration of the recess, Council was called to order and the following chairmen were named:

Committee on Publication—Chas. Caspari, Jr.

Committee on Finance—Chas. E. Dohme.

Committee on Membership—Lewis C. Hopp.

Committee on Transportation—Chas. Caspari, Jr.

On motion, G. W. Kennedy was elected secretary of the Committee on Membership.

C. B. Lowe nominated Wm. L. Cliffe, of Philadelphia, for Local Secretary for the next annual meeting, and, on motion, the nominations were closed and Mr. Cliffe was elected by the secretary casting an affirmative vote as directed.

G. W. Kennedy presented the names of four (4) applicants for membership, which, on motion, were directed to take the usual course.

On motion, the Council adjourned.

GEO. W. KENNEDY, *Secretary*.

SECOND SESSION OF THE COUNCIL—SEPTEMBER 21, 1901.

The Council was called to order at 9.30 o'clock a. m. by Chairman Thompson, with the following members present: Messrs. Caspari, Diehl, Dohme, Kennedy, Payne, Sheppard and Whelpley.

On motion of Chas. E. Dohme, the reading of the minutes of the first session was dispensed with.

On motion of Chas. Caspari, Jr., an additional appropriation of $60.00 for gold badges and bars was made, the Local Secretary having asked for a further supply of badges and bars.

On motion of Chas. Caspari, Jr., duly seconded, the sum of $100.00 was appropriated for the use of the Committee on Membership.

On motion of C. Lewis Diehl, the General Secretary was authorized to donate to the John Crerar Library of Chicago such volumes of the Proceedings as have been asked for.

On motion of H. M. Whelpley, seconded by S. A. D. Sheppard, the name of Frank L. James was placed on the roll of life members, old style, without the Proceedings.

The following report of the Committee on Future Welfare of the Association was presented by the chairman, and on motion of Chas. E. Dohme, was received and the recommendations adopted:

REPORT OF COMMITTEE ON FUTURE WELFARE OF THE ASSOCIATION.

Your Committee recommends to the Association that the exhibition be continued in the future, as they believe that the interest manifested by the members, particularly in the new feature, has proved that it may be an effective means of increasing the membership, and attracting, holding and educating all who come to our meetings. They also recommend that the rules adopted by the present Exhibition Committee be continued for the next exhibition, and that the feature of setting apart one session of the annual meeting for the purpose of listening to brief communications of the exhibitors be retained.

Your Committee believe that the outlook is most promising for the future welfare of the Association, and that continued activity and persistent work upon the lines already laid down, is the greatest need at present, as has been proved by the success attending these efforts at the meeting in St. Louis.

Respectfully submitted,

JOSEPH P. REMINGTON,
H. M. WHELPLEY,
W. S. THOMPSON,
ALBERT E. EBERT,
CHARLES E. DOHME
CHAS. CASPARI, JR.,
S. A. D. SHEPPARD.

Sept. 20, 1901.

G. W. Kennedy presented the names of three applicants for membership, which on motion were approved and directed to take the usual course.

H. M. Whelpley presented the following resolution which on motion of Chas. E. Dohme, duly seconded, was adopted:

Resolved, that the General Secretary be instructed to edit the stenographic report of the session of the Association devoted to hearing the remarks of exhibitors on their exhibits and publish in the Proceedings such an abstract as he may deem proper.

S. A. D. Sheppard presented an invitation to meet in California at an early date and moved, seconded by H. M. Whelpley, that the same be recommended to the Association for consideration.

On motion the Council adjourned.

GEO. W. KENNEDY, *Secretary.*

There being no objection, the Chair declared the minutes approved as read.

Mr. Remington said the Committee on Exhibition would like to make a short report at this time, with the permission of the Association.

Permission was granted, and Mr. Remington made the following report:

ST. LOUIS, *Sept. 20, 1901.*

To the Officers and Members of the American Pharmaceutical Association:

Your Committee on Exhibition would respectfully report that agreeably to your instructions, they have been enabled by the kind co-operation of twenty one manufacturing concerns and several of the Colleges of Pharmacy and by the individual effort of a number of members interested in the progress of pharmacy, to present for your examination a collection of material, which we trust has been of service to you.

The total expense of this feature of our convention has been borne by the exhibitors, and we find after paying all bills properly chargeable to us, there remains the sum of $564.75, for which please find herein check made payable to your Treasurer.

Respectfully submitted, JOSEPH P. REMINGTON, *Chairman.*

The report was received with applause, and, on motion, accepted.

MR. REMINGTON: I desire at this time to bring before the Association and to place on record my sense of the deep obligation of this Association to one who has helped us very greatly—Mr. Thomas P. Cook, of the city of New York. He took upon himself a large part of the work of the committee, and performed it to the entire satisfaction of the committee, and I am sure it would be approved by every member of the Association who could know of it. Now I want to offer the following resolution:

Resolved, That the Council be instructed to appoint a small Committee on Exhibition, which committee shall be considered a standing committee, also that all matters connected with the exhibition be in charge of the Council.

The necessity of this resolution is self-evident, I think, inasmuch as almost all the work connected with an exhibition has to be transacted between the times of the Association's annual meetings; therefore, the Council should have charge of the exhibition.

Upon motion of Mr. Kennedy, duly seconded, the resolution was adopted.

MR. LOWE: I am heartily in favor of the resolution introduced by Mr. Remington, but I think the Association ought to pass a vote of thanks to the committee, because the other members of the committee have worked quite as hard. He has singled out a single member of the committee, and I think a hearty vote of thanks should be returned to the entire committee for their splendid work in providing this exhibition, and I make that as a motion.

The motion was seconded and adopted unanimously.

Mr. Kennedy read an additional list of seven names recommended for membership, making a total so far of 150 names presented at this meeting.

MR. KENNEDY: It gives me pleasure to state that, since I have been on this committee, I have never received so many dues in advance. About 130 have paid up to this time, with the addition of a life membership of $75. The income up to this time from new membership is $700. [Applause.]

THE PRESIDENT: This is a very gratifying report. Without objection, the report will take the usual course.

MR. RAPELYE: I have a resolution recommended for adoption by the Section on Commercial Interests that I would like to present:

Resolved, That the Section on Commercial Interests recommends that the American Pharmaceutical Association endorse in general session the so-called Worcester Plan, and recommend the adoption of the same by the manufacturers of proprietary articles.

This resolution, which was offered by Mr. Sheppard at the Section meeting, was enthusiastically received and unanimously adopted by the Commercial Section.

On motion of Mr. Ebert, seconded by Mr. Sheppard, the resolution was adopted.

The Secretary called attention to two very interesting papers that had just been distributed among the members present, saying that Mr. Lloyd, the author, had requested that this be done, with the explanation that they were not to be read in open meeting, as they were historical reminiscences more suited to be read in the quiet of the home. The full text of the papers, which were entitled "Versatility of Dr. Charles Rice" and "A Ginseng Garden," is as follows:

VERSATILITY OF DR. CHARLES RICE.

BY JOHN URI LLOYD.

In presenting the phase of the life of Dr. Charles Rice touched upon in this paper, I realize that I am making public a section of thought and action which involved private correspondence and was largely personal between Dr. Rice and myself. But in a case like this I cannot but feel that the material at my command should be recorded where it can be viewed by the future historian, who will desire to touch upon just such points as this concerning Dr. Rice in order to make his work complete. And I know of no more fitting place for this paper than the records of our society! To us of the pharmaceutical and chemical professions who were acquainted with Dr. Rice, who knew him intimately from the professional side, who knew of the breadth and depth of his thought as concerns pharmaceutical subjects and matters, and lastly, who comprehend the prodigious amount of work that he did in this direction aside from the Pharmacopœial Chairmanship, it seems that this man would have little if any time for outside thought. Yet that such was the case is apparent, to

me it perhaps has been more so than to any other man of this Association, and I shall, therefore, presume to call to the attention of our members certain phases in Dr. Charles Rice's character that must add a peculiar interest to the study of his life work. But as I have said, the subject is largely personal, and somewhat delicate for me to introduce, yet no other man can record the facts.

When my book Etidorhpa was announced Dr. Rice took much interest in the project. I will add by explanation that while working on this publication I felt great hesitancy by reason of the fact that I apprehended the resistance of such men as Dr. Rice, and others whom I might name, but whom it is unnecessary to mention. I feared that these men might consider my apparent departure from exact science, even though it be for mind rest, in a way to subject me to personal criticism. But let that pass. Neither of the parties mentioned, nor others engaged in similar pursuits, took that view of the matter, nor did any other man of all those I expected to do so.

To return to the subject under discussion. Dr. Rice not only overlooked these things that I thought he might venture to resist, but exhibited a remarkable enthusiasm in the direction of my apparently new departure. I take it that he saw that my work was not very far outside the field of the legitimate scientist, and perceived much in this speculative wonder-land which to many persons less talented than Dr. Rice would have been connected only with thoughtless ramblings of the mind. In this case, however, the problem was viewed very differently. As I have said, not only did Dr. Rice enter heartily into the subject under discussion, but wrote most interesting letters regarding different phases of this thought expression, speculative outreaches, phases that came to him as he read the book and caught suggestions concerning outlying lines which at a future time should be developed. Dr. Rice, I take it, perceived first of all that a study of cold scientific fact may lead scientific men to rational speculation concerning that which seems irrational to people less fortified than was himself, and perceived things in a way that would not be possible to a superficial person who attempts to make a wonder-story out of things that have no foundation in either thought or fact. I know too that Dr. Rice caught many underlying touches of irony in Etidorhpa, which other persons might take and did take in a very different sense. But let this pass.

My object will be accomplished if in addition to the other attainments that we know as having been possessed by Dr. Rice is that of interest in imaginative thought outside of legitimate science, and I will freely say that had I not received this considerate expression from Dr. Rice, Dr. Hoffmann, Professors Prescott, Remington, Ebert, Sayre, Kremers, Simon, and a host of others whom I might name, neither Etidorhpa nor any of my studies of Kentucky life would have been published. I should probably have sought amusement and recreation in other directions, in fields

wherein most people find their rest and relaxation; for as is well known, these works have all been written while I was doing my heaviest work in scientific directions, during periods of mind-strain when I needed mental relief of some kind.

But let us now pass to the publication that appeared next, apparently concerning a line as far from science as pure fiction can be. I refer now to the Kentucky study, "Stringtown on the Pike," and I do not exaggerate when I say that Dr. Charles Rice, the world-renowned scientist, the exact man of letters, the great linguist, took even greater interest in "Stringtown on the Pike" than he had in "Etidorhpa," and that too from the very start. He caught the fact that my cardinal object was to record conditions existing forty years ago in what was, to the date of the publication of this book, an unknown section of our country. He discovered as the book progressed that the work was in one sense scientific, in that I was trying to leave to posterity a pen picture which would convey to other peoples a portrait of human life and human emotions that existed on the border land between North and South in the momentous period during and following the Civil War. Dr. Rice entered with enthusiasm into the work I was attempting to do as faithfully as it was possible for me to accomplish it, and which I knew and he knew must be done by myself or left undone forever. Let me abstract from one of his letters a few lines giving his opinion of this line of work, as follows:

"Within the last two weeks I have become the recipient of two works, with your highly-prized dedication, both of which will make their mark in the world. Indeed, one of them has made it long ago, and even before it was actually published, was eagerly awaited. Of course, I mean your 'Stringtown on the Pike.' The people will expect you to put this particular talent to good and frequent use hereafter."

But now comes a point concerning the workmanship of this book which may be of general interest—a point that gave me the greatest trouble—and into which Dr. Rice entered with zeal, viz., the attempt to depict by *dialect* the manner of speech and the colloquialisms of the people among whom I was raised, and of whom I am a part. The process adopted was as follows: First, a glossary was made of the corrupted words. This glossary was submitted for criticism to persons who lived in that section of the country, as well as to dialect students of note elsewhere. The opinions and suggestions of these people were carefully considered, and the glossary revised in accordance therewith. A new glossary was then made, containing every broken word in the book, and this the compositor was directed to use, and to adhere to closely. I know of no other dialect story submitted to the same scientific process. All of this concerned Dr. Rice very much, and naturally when the book appeared I awaited anxiously his final criticism and comment. From one of his subsequent letters I abstract his opinion, and also his further suggestions which came after "Stringtown" appeared in bound form, and which suggestion I now

credit him with publicly, and which I intend to put into force if I make further studies of the people with whom my boyhood days were spent:

"All your critics say that you have reproduced the dialects as near as letters could make them. Now, in connection with this rendering of dialect, I want to mention something which will probably be already known to you, but which will not suffer from being repeated. Some foreign authors of novels, when they want to get as near to a special dialect as possible, go to the district where it is spoken, or hunt up some one in their vicinity who speaks it correctly, and get the passages that are to be in dialect spoken into a phonograph. This makes a record which can at any time be reproduced at any desired tempo, and from which the rendering in letters may be verified. This is also done by some teachers of foreign languages, some even selling the 'records' to persons residing in other places. These 'records' teach pronunciation."

But let this paper end. My object is to present before this American Pharmaceutical Association a side of the life of Dr. Charles Rice that his nearest friends might think would have been an impossibility, and in the sense it is presented, I take it, this paper, although not on any pharmaceutical subject whatever, will be kindly received and valued by this society, perhaps even more I hope than if it were confined to pharmaceutical science exclusively. It records a phase of life which shows us that men like Dr. Rice, who devote their whole time apparently to one line of thought, have privileges in human action. The study of life is the right of every man.

A GINSENG GARDEN.

BY JOHN URI LLOYD.

When the American Pharmaceutical Association met in Kansas City, in 1881, Mr. Huber, of Fond du Lac, Wisconsin, consulted the author of this paper regarding the cultivation of ginseng. The firm with which he was connected was much concerned in American roots, barks and herbs, and Mr. Huber thought of fortifying the wild ginseng by that grown in cultivation. He presented the author of this paper with a package of seed and we talked over the possibility of the venture. So far as the writer is concerned, he does not know that Mr. Huber did anything more in that direction, although if memory does not fail, he stated at the aforenamed meeting that he had not been successful in practical propagation. During the recent year or two this subject of ginseng cultivation has been again agitated, and it is now taking quite a hold on the thought of persons engaged in developing the resources of our country. Indeed, the problem is an important one, for we all know the value of ginseng as an article of exportation to China.

In March, 1885, the author of this paper called attention (in a supplement to Drugs and Medicines of North America) to the use of ginseng in China, and although that phase of the subject is not directly connected with our article, we presume to introduce herein the note referred to. By reason of its past and present interest and also by reason of the fact that

this supplement to the publication mentioned is entirely out of print, the data should be recorded:

"*The Use of Ginseng in China.*—The following letter from Mr. Kwong Ki Chin, a highly educated gentleman, and former professor of the Chinese language in Yale College, is of special interest on account of its reliability. It was written to us in 1881, in reply to our inquiries on the subject:

'The Chinese physicians make frequent use of ginseng root, particularly in Canton province, but do not regard it as a panacea. The fact and occasions of its use are quite familiar to me from my having studied and practiced medicine for some time in China.

The Chinese ginseng grows in but few localities, is very scarce, and commands a high price—the best commanding a hundred times its weight in silver, and from that down to half its weight, according to the locality where it is grown. The native root has different and more tonic properties than the imported. We think it strengthens the breath and sometimes saves life. The emperor and his friends consume nearly all the high-priced native product.

Doubtless the medicinal value of the plant is exaggerated, and the popular belief in its virtues heightened by the example of the imperial family and wealthy persons in using it.

That imported from America is considered to have cooling properties and to be especially useful in yellow fever and inflammation of the bladder. It is also given for tenderness and enlargement of the liver, and whenever the urine is high colored. It is also considered to promote the discharge of urine. Sometimes persons who have taken liquor to excess, eat a little of it with benefit to relieve the tipsy feeling. We regard it as opposite in properties to ginger-root and cinnamon.

It is not used for incense.

You are at liberty to mention my name in connection with the statement, if you desire.'"—*Addenda to Drugs and Medicines of North America, 1885.*

As is well known, the section of country about Cincinnati, the heavily-wooded Ohio Valley, was (and is yet a factor) the chief source of ginseng supply. But as the woods have been mostly cleared off and the thickets cleaned out, this plant, which never grows in beds and is always very scattering at the best, became scarcer and scarcer, until now it is nearly in a condition of extermination.

During the time the section of country in which the root was indigenous was producing large quantities of ginseng, the hills and knobs of Boone (Stringtown) county, Kentucky, were wooded, thickly underbrushed, the soil was very rich, and there the ginseng grew to perfection. But things even here have changed The great knobs are bare, the woods are gone, the ginseng has disappeared. The price the gatherers received in the time of the boyhood of the writer of this paper was 50 cts. per lb., even as low as 25 cts. per lb., but now the price reaches from $4.00 to $4.50 per lb. Only from the almost inaccessible mountain lands of West Virginia and Eastern Kentucky and Northern Tennessee (largely culled dry) can we expect to get the vanishing supply of ginseng for the future, a supply that in 1886 amounted to 80,000 lbs. from this one city of Cincinnati.

And now, after these preliminary remarks, we reach the subject of this article. In a recent visit to Boone county (Stringtown), the old home

land of the author, he was asked if it would be of interest to visit a ginseng garden. Of course the writer was concerned immediately, and took the first opportunity to do so. This garden belongs to Mr. S. Long, of Union, Boone Co., Ky., and is shown by the picture accompanying this paper, which is a photographic view by Mrs. Lloyd of the garden, and was taken this summer. It is situated in the shade on the side of a hill, is fenced in by a tall paling fence with narrow cracks between the palings. About ten feet in height it is covered with three-inch slats, between which about ¾-inch space is left for the light, and in very hot weather in the summer the top is covered loosely with brush. We thus briefly describe the surroundings of the garden. Inside it bears the appearance of any vegetable garden under proper conditions where the stock seems to be

Ginseng Garden of Mr. S. Long, Union, Boone County, Ky.
(Photographed by Mrs. John Uri Lloyd.)

thrifty and in its native element, and as I found Mr. Long very willing to impart information concerning the same, I hereby relate, in his own words as he gave it, his experience with this ginseng garden:

"I secured first about 300 plants from the woods where ginseng naturally grows in this section of the country. These plants were taken up with great care, plenty of dirt being left on the roots. They were carried in the cool of the day from their native location to the garden I had prepared. The earth was such as I would have used for the purpose of raising onions, a rich loamy soil. These plants were set about 6 inches apart, the rows being about 6 inches from each other. I did not notice in any instance that the transplanting disturbed the early plants in the least. From these 300 plants I collected the first year about 3000 seed. That fall when the seeds had ripened I col-

lected from the woods about 600 more plants, which I planted in the same manner as I had done the 300 plants, making a total of 900 roots. The following spring out of the 900 roots, 800 came up making a good crop of seed. To this I will add that of the plants set out in the fall there was a greater proportion lost than of the plants that were set out in the growing season. The seeds that ripened in July, if planted at once, will come up the next spring; those that ripened later do not come up until the second spring. I cannot give the proportion of loss in sprouting. The first year's plant is a little three-leaved spindle, and the growth is very slow. As is well known, the scars left by cast-off stalks give the age of the root. I have plants in my garden that are at least twenty years of age. I am cultivating Ginseng both for the root and the seed, the seed at this time being very costly, although the root only has any commercial value except for planting. I am enlarging my gardens as rapidly as possible and use all the seed that is produced, at present having none to distribute.

It will be seen from the above that Mr. Long supplies from his own experience in a Ginseng section of the country just the data to serve persons concerned in drug cultivation. The fact that he did not go to the woods for natural dirt seems in my mind to be of great interest, for it is certain that in any section of the country a slat garden after the manner of Mr. Long's garden can be easily put up, and it is also easy to obtain mature plants from gatherers by paying them an additional price therefor. As the writer of this paper predicted years ago, either cultivation must be given such plants as Ginseng and Hydrastis, or they must within a moderate period become extinct.

The Secretary also stated that, since the last general session, the following telegrams had been received from the Mayor of Philadelphia and the President of the Pennsylvania Pharmaceutical Association, touching the matter of the Association's proposed celebration of its semi-centennial next year:

PHILADELPHIA, PA., *September 18, 1901.*

TO JOHN F. PATTON, *President American Pharmaceutical Association, St. Louis:*

The citizens of Philadelphia join with the Pennsylvania Pharmaceutical Association in extending a cordial invitation to your Association to celebrate its fiftieth anniversary in this city.

SAMUEL H. ASHBRIDGE, *Mayor.*

PHILADELPHIA, PA., *September 18, 1901.*

TO JOHN F. PATTON, *President, Southern Hotel, St. Louis, Mo.:*

The pharmacists of the Keystone state, through the Pennsylvania Pharmaceutical Association, congratulate the American Pharmaceutical Association upon the approach of their semi-centennial and urge its celebration in Philadelphia.

W. L. CLIFFE, *President.*

MR. SHEPPARD: Here is an invitation from California—two of them, in fact. Mr. Searby, of San Francisco, is not able to be with us this morning, and he asked me to be his spokesman in regard to this matter. He brings with him two invitations, one from San Francisco and the other from Los Angeles. Of course each of these invitations requests that the meeting be held in the city from whence it comes. Mr. Searby's thought is, that we should begin to agitate this subject, as we all know that such an important move as a long-distance meeting in California requires to be thought over years in ad-

vance. [Laughter.] I think the previous meeting was considered ten or twelve years before we finally went there. Mr. Searby suggests that we try to have the meeting in California in the year 1904, if possible. His argument for that date is this: The meeting for 1902 is fixed in Philadelphia. In 1903 the World's Fair will be held in St. Louis, and the pharmacists of the country very generally will be considering the question of a vacation trip to this city, and therefore would not consider favorably another long trip. But in 1904, so far as Mr. Searby's knowledge extends, there is no special attraction in this country to keep them from considering a trip to the Pacific Coast; therefore, he wishes to suggest that year, and hopes it will be acted on in a general way. He recognizes that it would be well not to take any specific action at this time, but he thinks some general action might be taken at this session.

THE PRESIDENT: The telegrams of invitation read, with the invitations to go to California, are now before you, gentlemen. The motion is, to pass a formal vote of thanks for these several invitations.

And the motion was so put and carried.

MR. LOWE: At the meeting of the Section on Education and Legislation last evening some action was taken which I will have to report as ex chairman, in the absence of the retiring and newly-elected secretaries. The Committee on Chairman's Address accepted a recommendation made by the Chairman as to the necessity or desirability of having a bill prepared for introduction into the Federal Congress looking to the correction of the evils of the present patent and copyright laws as applied to medicines, the Committee recommending that the proposition be referred to the Committee on National Legislation with power to act, subject to the approval of the Association. I presume this matter will come before the Association at its next annual meeting. I simply desire at this time to call attention to the Committee's action in this matter.

The Chair called on Mr. Payne to make the report of his Committee on Status of Pharmacists in the U. S. Army and Navy, and Mr. Payne presented the report in abstract, the full text being as follows:

REPORT OF THE SPECIAL COMMITTEE ON THE STATUS OF PHARMACISTS IN THE ARMY, NAVY AND MARINE HOSPITAL SERVICE OF THE UNITED STATES.

We will not take up the time of the Association by going into any detailed statement as to our labors for the past year. We have written many thousand letters, and have chiefly concentrated our efforts upon the Marine Hospital service. Although considerable work has been done both in the Army and Navy, we have found our work more efficient when focused upon one department at a time.

Last year our Committee had the pleasure of announcing to the Association during the meeting at Richmond, that Governor Roosevelt, of New York, had just signed the bill creating a first lieutenant for each regiment of the National Guard of New York. We regret to announce now that the bill, after being in operation about one year, has been repealed. This repeal was unfortunate. Governor Odell, of New York, was strongly urged by the pharmacists of New York and by our Committee to veto the bill. But as the provision reducing the pharmacists from the rank of commissioned officers was part of a voluminous act, involving a number of other important matters, the Governor of New York could not see his way clear to veto the bill, as other matters which we considered of great importance would be nullified also. The party who is said to have instigated the clause which deprived the New York pharmacists of commissions is quoted as having made some very severe remarks upon the social standing of pharma-

cists, and we understand has since been removed from his official position, over which you will probably shed no tears.

During the year we have had an interview with the Surgeon General of the Marine Hospital Service, and have also received letters from others whom we believe to be posted, both of which led us to hope that we would be able to announce at this meeting that the grade of pharmacists with increased recognition had been instituted by the Marine Hospital Service. This, we were under the impression would occur last July. It did not occur, however, and we understand that efforts are now being made to take the Hospital Stewards from under the Civil Commission, where we suceeeded in placing them, and to obtain hospital stewards in the future from the enlisted hospital nurses, who show most efficiency. It has been intimated to us that there may be an early change in the present supervising Surgeon General of the Marine Hospital Service, and as men who are more and more in touch with the progress of the times are appointed we find the modern pharmacists better and better appreciated and recognized.

Our new President, Theodore Roosevelt, of New York, when Assistant Secretary of the Navy, aided us materially in securing pharmacists in the Navy with the rank of Warrant Officers, which is about equal to second lieutenant in the army. As Governor of New York, he helped us to secure pharmacists with commissions as First Lieutenant for the National Guard of New York. As Vice President of the United States, he wrote us a kindly letter last month in reply to a letter of ours in regard to our present efforts in the Marine Hospital Service. In response to our letters to President Cleveland, during his last term, the Hospital Stewards of the Marine Hospital Service were placed on the civil service list. In response to our letters to President McKinley last year, the effort made by certain parties to remove the hospital stewards from the civil service list was defeated, and under the present President we certainly feel very hopeful of the further recognition of pharmacy in the public service.

We earnestly request the pharmacists of the whole United States to not only continue their active work for the advancement of pharmacy in the public service, but also for the recognition of pharmacists as commissioned officers among our state troops, as this will be of much assistance in advancing us toward that professional recognition we desire.

We have had hundreds of letters in regard to drawing up bills for securing the title of pharmacists and commissions among the State troops, and desire to make the following suggestions in regard to such work:

1st. Draw up your bill as an amendment to the present act regulating the medical corps of your state troops, and incorporate what you wish, and consult some lawyer friend to see that the technicalities are observed.

2d. Consult the Chief Surgeon, or Surgeon General of your State in regard to the amendment and secure his co-operation. He will naturally desire the pharmacist to rank one grade below the Assistant Surgeon. This, in some cases, will make his rank that of Second Lieutenant. This will harmonize matters and avoid opposition.

3d. With the bill presented by one of your representatives, write to all the pharmacists of the State and urge them to write immediately to their representatives and senators and urge them to support the bill.

4th. Go yourself before the House and Senate Committees to which the bill is referred and explain the matter in a plain, practical manner.

Our committee wishes to thank most heartily the members of this Association, and the pharmacists of the United States, for the splendid response and co-operation which has been given to our work in the past, and also during the present year, and to the pharmaceutical press we wish to reiterate our expression of regard and appreciation for its continued cordial endorsement and support.

Respectfully submitted, Special Committee,

GEORGE F. PAYNE, *Chairman.*

Mr. Payne was applauded upon his report of the committee's work.

Mr. Ebert moved to receive the report, and said:

I think the thanks of the Association are due to Mr. Payne for the amount of work he has done in this matter, but I fear—as I do not see any recommendation or any relief suggested—the Association has gone far enough. We have not his expense account so far; it is not in the report, I believe——

MR. PAYNE: I am not asking for a cent this year, and do not expect to ask for any. We are doing the work entirely at our own expense.

MR. EBERT: Then if the committee has written thousands of letters over the country in this cause, it is a hardship that the Association should not impose upon the gentlemen. It is too much to ask of a committee to expend their own money in doing work for the Association in a good cause like this. My object in rising was simply on that account, namely, to prevent any further unnecessary expense.

After a somewhat lengthy discussion of the possible success of the committee's efforts to improve the status of the pharmacists in Government employ, which was participated in by Messrs. Payne, Ebert, Sayre and Sheppard, Mr. Mayo moved a formal vote of thanks to the committee, and that the committee be continued.

Mr. Eberle seconded the motion.

MR. MITTELBACH: I have been touching elbows with Mr. Payne in this matter, and I realize that he has done a very good work—a noble work. I like his spirit, too—the true American spirit. When you are on the right track, pursue it, and meet all odds. He is willing, he says, to pursue the same line, and I heartily endorse the suggestion that we continue him as the head of that committee.

The motion was unanimously adopted.

The chair called for the report of the Committee on General Prizes, and the Secretary read the report as follows:

REPORT OF THE COMMITTEE ON GENERAL PRIZES.

To the President and Members of the American Pharmaceutical Association:

The undersigned Committee on General Prizes having been provided with copies of papers read at the last annual meeting of the Association in the city of Richmond and printed in the report of the Proceedings of the Association for 1900, do respectfully report and recommend the following awards:

The Hermann Hager Memorial Prize to Charles A. Walter, Indianapolis, Ind., for his valuable and thorough paper on "Proximate Analysis of Eupatorium Perfoliatum."

The Committee have deemed the Report on Practical Pharmacy and Dispensing, presented by Henry P. Hynson, of Baltimore, as worthy of the first General Prize; but as according to the Constitution such an award is not legal, we recommend in lieu thereof that the Association award to Mr. Hynson and his committee a special honorarium of fifty dollars for their valuable report.

The second General Prize is awarded to A. B. Stevens, of Ann Arbor, Mich., for his valuable and instructive paper on "Wild Cherry Bark and its Preparation."

The third General Prize is awarded to Louis Emanuel, of Pittsburg, Pa., for his useful and valuable paper, "A Scheme to Popularize the United States Pharmacopœia as the only Means to Combat Quackery in Medicine."

CHAS. T. GEORGE,
C. S. N. HALLBERG,
O. A. WALL.

Mr. Eberle moved that the report be received and adopted, and the motion prevailed.

The chair called for the report of the Committee on President's Address, which the Secretary read as follows:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The committee to which was referred the President's address beg to submit the following report:

1. The recommendation of our President that the Committee on National Legislation "be made a permanent one, and that it consist of three members, the chairman to reside at the seat of the General Government, and that the other two represent respectively, a large eastern and western city," has already been acted upon by the Association in general session, a similar, if not the same, recommendation having been made by the Committee on National Legislation.

Your committee, however, is inclined to question the wisdom of restricting the chairmanship of this important committee to the National Capital. The citizen of Washington has no political status; in most instances he is apt to know less about the trend of legislation at the Capital than non-residents; and last, but not least, it may at times be impossible to secure the right man for this position if the choice be limited to this one city.

2. Your committee heartily agree with our President in pointing out the differences that exist and should continue to exist between an association such as the American Pharmaceutical Association and organizations whose objects and aims necessitate the placing of restrictions upon the individual that become increasingly irksome with greater depth and breadth of mind. We do not, however, deny the necessity of such organizations, and wish them success commensurate with their usefulness.

3. Concerning the proposed Procter memorial and the commemoration of other American pharmacists who have done so much for our calling, your committee is of the opinion that a special committee should be appointed to ascertain what is practical. Only after definite figures are placed before the Association will it be possible to decide which of the several plans proposed can be carried out so as to most fittingly perpetuate the memory of those whom we desire to honor and at the same time reflect the greatest possible credit upon pharmacy in America.

W. S. THOMPSON,
S. A. D. SHEPPARD,
EDWARD KREMERS.

Mr. Ebert moved to receive the report, and that the recommendation of the committee that the Association rescind its action in regard to requiring the chairman of the Committee on National Legislation to be a citizen of Washington City be adopted.

THE PRESIDENT: I would suggest that the endorsement of the report of the committee will cover that point.

Upon motion, the report was then adopted.

The chair having called for the report of the Committee on Semi-centennial Celebration, Mr. Good presented the following:

REPORT OF THE COMMITTEE ON SEMI-CENTENNIAL CELEBRATION.

To the Members of the American Pharmaceutical Association:

Your Committee on Semi-Centennial Celebration of the Association beg leave to report that its recommendations submitted at the annual meeting held in 1899, and approved, have been, in part, definitely adopted, viz.:

1. To meet in the year 1902 in the city of Philadelphia.

2. To make provision for an exhibition, under proper restrictions, of crude drugs, chemicals, pharmaceutical preparations and appliances, etc.

Other recommendations which made provision for publishing a history of the Association with brief biographical sketches of the members; publishing a review of the progress of pharmacy and of the growth of the Association; preparing and issuing a jubilee volume, do not at present seem feasible because of the considerable outlay of money required to do these things in a creditable and satisfactory manner.

We suggest, instead of the last mentioned publications, that the volume of "Proceedings" for that year be enlarged so as to include some or all of these subjects, and that the paper, press-work and binding be distinctive and better than are the regular annual volumes in these respects.

The work of this Committee having been finished, as far as practicable, we ask to be discharged, and we suggest that a new committee composed of members living in or near the city of Philadelphia be appointed to carry out the ideas and wishes of the Association for its Semi-Centennial gathering.

Respectfully submitted,

J. M. Good,
C. S. N. Hallberg,
S. A. D. Sheppard,
Joseph P. Remington,
John Uri Lloyd.

The President: What is the pleasure of the Association in regard to this report? There are some recommendations contained in it.

Mr. Anderson moved to receive, and that the recommendations be adopted. Carried.

The Secretary presented the Report of the Chairman of the Council on the Invested Funds of the Association, which on motion was ordered to be printed in the Proceedings.

REPORT OF THE CHAIRMAN OF THE COUNCIL ON THE FUNDS OF THE ASSOCIATION.

The investments and cash belonging to the several funds of the Association, in possession of the Chairman of the Council on June 30, 1901, consist of:

EBERT FUND.

1 U. S. Reg. 4 per cent. Bond, No. 160,603, for	$100 00	
1 U. S. Reg. 4 per cent. Bond, No. 67,880, for	500 00	
1 U. S. Reg. 4 per cent. Bond, No. 2,125, for	100 00	
		$700 00

Cash balance from last report	$62 04	
Received since then	31 28	
	$93 32	
June 1st, 1900. Paid for Ebert Prize	28 00	
Balance in F. I. T. & S. D. Co., Philadelphia		$65 32

CENTENNIAL FUND.

1 U. S. Reg. 4 per cent. Bond, No. 145,640, for	$1000 00	
1 U. S. Reg. 4 per cent. Bond, No. 160,604, for	100 00	
1 U. S. Reg. 4 per cent. Bond, No. 2,126, for	100 00	
1 U. S. Reg. 4 per cent. Bond, No. 2,127, for	100 00	
		1300 00
Cash balance from last report	$256 95	
Received since then	62 20	
Balance in F. I. T. & S. D. Co., Philadelphia		319 15

LIFE MEMBERSHIP FUND.

11 U. S. Reg. 4 per cent. Bonds, each for $1,000.00 (Nos. 145,639, 145,761, 145,672, 150,826, 150,827, 150,828, 164,889, 173,049, 185,893, 202,591)		11000 00
Cash balance from last report	$1137 44	
Received since then	618 70	
	$1756 14	
Dec. 18, 1900. Paid one year's income to the Treasurer	440 00	
Balance in F. I. T. & S. D. Co., Philadelphia		1316 14

GENERAL FUND.

4 American Security and Trust Co.'s debenture bonds, each for $500 (Nos. 94, 95, 98, and 99)	2000 00

Two of the bonds named in last report were sold February 23, 1901, for $1,012.56, and the proceeds used to pay loan.

The interest on the General Fund is paid to the Treasurer.

All interest paid to date.

Washington, D. C., July 1, 1901. W. S. THOMPSON, *Chairman of Council.*

THE SECRETARY: There are two motions I should like to offer here separately. It has been customary for some years past to adopt similar motions to the one I will offer first, with the view of facilitating business at the next annual meeting:

Resolved, That the local Secretary for the year 1902 be Chairman of the Committee of Arrangements for that meeting, with instructions to appoint the other members of that Committee, and to report their names to the General Secretary for publication in the Proceedings.

On motion of Mr. Whelpley the motion was adopted.

THE SECRETARY: Now I will offer the following motion, for fear it may be overlooked or forgotten in the haste of closing if it be deferred:

Resolved, That our President-elect, Dr. H. M. Whelpley, be requested to take charge

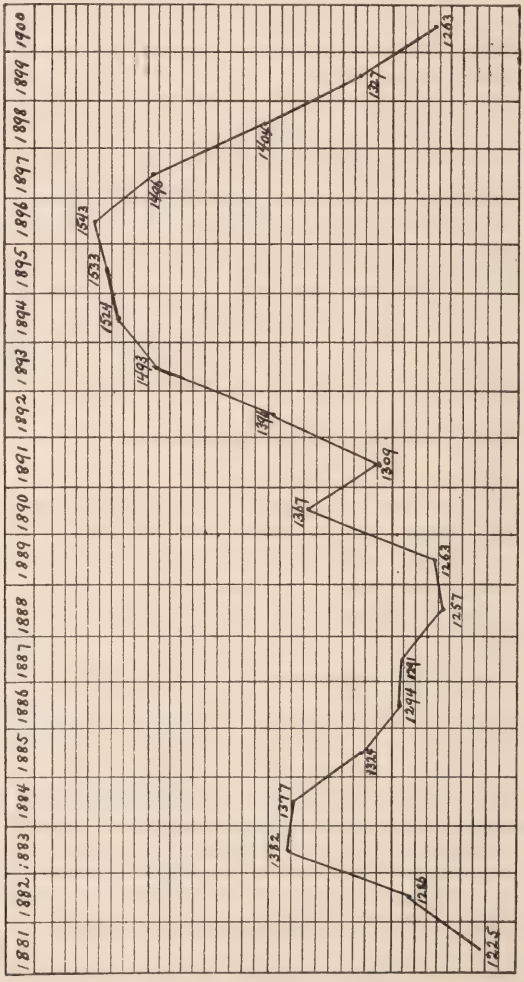
of the eleventh or social session, immediately to follow the close of the tenth, and on the adjournment of the same to notify the General Secretary of such action.

The motion was adopted without dissent.

The following statistical record of membership was presented by Mr. J. W. T. Knox and, on motion, referred to the Committee on Publication:

FACTS REGARDING OUR MEMBERSHIP.

The accompanying table shows the exact numerical strength of the American Pharmaceutical Association for the past twenty years. Honorary members are not taken into consideration.



The figures are taken from the Proceedings in each case, and are therefore authoritative.

It is evident that from 1896 to 1900 the membership suffered a steady and practically uniform loss, aggregating 18 per cent. of the total.

The membership is smaller than it was in 1882, while only a trifle larger than in 1881.

In its numerical relation to the retail drug trade, the Association has lost ground since that time. It has been estimated that there were 28,000 retail druggists in 1880; and in round numbers there are 40,000 now.

Assuming the correctness of these figures, the membership has fallen from 43 per thousand in 1881 to 32 per thousand in 1900, a loss of 25 per cent.

But there are about 80,000 practising, registered pharmacists, so that the A. Ph. A. represents only about 16 per thousand.

The American Medical Association, of practically the same age as the A. Ph. A., having a very similar form of organization, and charging the same annual dues, has been more fortunate.

In 110,000 practising physicians it has over 10,000 members, if I am correctly informed.

This is about 91 per thousand.

If the financial ability of the medical profession is to that of the pharmaceutical profession as 91 to 16, the showing is an equal one in some respects. But I do not believe there is such a difference between the two professions in point of wealth.

It is not my purpose to attempt an interpretation of these figures at this time, but I respectfully submit that they indicate a situation so grave as to merit the earnest thought of every loyal member of the American Pharmaceutical Association. The hope that this matter may receive general consideration prompts me to bring it to your notice in this form.

THE SECRETARY: I think, Mr. President, we have now disposed of all the business that has been brought to the notice of the Secretary.

MR. MASON: Mr. President, I desire to move a rising vote of thanks to Local Secretary Whelpley and his good wife, to the pharmacists of St. Louis and their wives who have had to do with the entertainment of the visitors, to the faculty of the College of Pharmacy, who afforded us so profitable a view of their most excellent institution the other evening; to the newspapers, which have given considerable space to the proceedings of the Association, and to all others who have contributed towards making the meeting so well attended, so thoroughly enjoyable and so successful in every way. Mr. Whelpley has worked hard for months in the interest of this meeting. He has developed every possible opportunity to make it a great success. He has written, as I personally know, letter after letter to increase the attendance. He has simply deluged the pharmaceutical press, in order that the matter might be kept before the minds of the pharmacists of the country. Since we have come here to St. Louis he has perfected arrangements in a way that could not be improved upon. But excellent as his work has been, that done by Mrs. Whelpley has not been less satisfactory and pleasurable. I have been assured by the ladies that their comfort and pleasure have been looked after in the most thorough and hospitable and cordial manner, and both the work of Mr. and Mrs. Whelpley has been ably assisted by the local pharmacists and their wives and daughters. We think the success of the meeting—and it has been one of the most successful in recent years—has been largely due to the doctor, his good wife, and their able corps of assistants.

MR. HALLBERG: I would like to second that resolution. When we arrived in this city, the first day I took a walk out Olive street, and I found they had spread ladders on the side-walks on that street, and half the population seemed to be trying to walk on the ladders. I think that, possibly, that was in preparation for the Louisiana Purchase Ex-

hibition. But I was satisfied we would be well taken care of, for I found life-rafts there for service, showing the foresight of Mr. Whelpley in making the arrangements. I speak for one of your suburban cities [laughter] when I say that everybody will come here from Chicago two years from now, to visit the Exposition that has never been equaled—not even by the "White City" in Chicago. The citizens of St. Louis were the ones that made it possible for Chicago to get the World's Fair in 1893, and we feel it is our duty to do all we possibly can to promote one of the grandest events in the twentieth century in 1903.

The chair called for a rising vote upon the motion of Mr. Mason, and it was unanimously adopted.

MR. WHELPLEY: In rising to acknowledge this vote, I desire to do so not so much on behalf of myself and my good wife as on behalf of the good pharmacists of the city and State, and those interested in the pharmaceutical profession and trade in St. Louis; and I am pleased to have this opportunity of saying that the entire profession and allied trades of St. Louis have taken the same earnest and unceasing interest in the preparations for this event as has been taken by the chairman—who perhaps has come more particularly in contact with the editors than have the individual members of the committee—and I can say that our frequent, protracted and interesting meetings have been carried on in perfect harmony and accord. We have had but one interest—the success of the meeting; and all have united in their efforts in that direction. So I feel that whatever honor may be due for the success of the meeting should be evenly divided over a large number of heads—those constituting the drug trade and its allied interests. [Applause.]

THE SECRETARY: Mr. President, we have now reached the stage in our proceedings for the installation of officers of the Association for the ensuing year. All business that has been brought to the notice of the Secretary has been disposed of.

THE PRESIDENT: The installation of officers is now in order, then. I will appoint Mr. Mayo, of New York, and Mr. Koch, of Pittsburg, a committee to conduct the newly-elected President to the chair.

The gentlemen named performed that very agreeable duty, applause greeting the new President as he came to the front.

Mr. Mayo, introducing the President-elect, said:

Mr. President, fellow-members and pharmacists: It affords me a great deal of gratification to present to you—and I have a sense of personal triumph in doing so—the first editor elevated to the Presidency of the Association. We have heretofore been under the ban, as it were. We have been entitled to toil to the utmost, and we have toiled, but we have not been recognized before in so signal a manner. Gentlemen, I know Mr. Whelpley will discharge the duties of the office to the credit of pharmacy and the editorial chair. [Applause.]

President Patton, turning to the President-elect, then said:

Mr. Whelpley, it affords me great gratification to welcome you to the dignity and responsibilities of this high office. Your fellow-members have selected you and conferred upon you the highest honor in the gift of the pharmacists of this country. We feel that in decorating you with the insignia of office and handing you the gavel repre-

senting authority, the Association's interests are not committed to unworthy hands. The work you have done in the past is a promise of what you will do in the coming year.

Gentlemen, I have the honor of introducing to you Mr. Henry M. Whelpley, of St. Louis, President of the American Pharmaceutical Association. [Applause.]

Mr. Whelpley said:

Mr. Patton, the chair which you now vacate has been occupied by almost half a century of illustrious Presidents, and do you wonder that I, an humble member of the younger generation in the American Pharmaceutical Association, should, at this time, bow my head and hesitate? I am reminded of a newspaper advertisement which read thus: "Wanted—A good, strong horse, to do the work of a poor country minister." I trust, Mr. Patton, that your mantle will fall gently upon the shoulders of the fourth President to be selected from the section of the country west of the Mississippi River, and may its ample folds carefully conceal my many shortcomings.

Fellow-members of the American Pharmaceutical Association, like one of my distinguished predecessors, I feel that I am now assuming duties and obligations that no one has a right to seek. I also feel that I am accepting a position that few, if any, members of the American Pharmaceutical Association would have a right to decline. Now that you have by your votes placed me in the chair of the chief executive, I shall expect you to give me your continued hearty support in the work and duties of the office. I thank you, one and all, for the honor that it implies, and trust that I may continue to deserve your confidence and esteem. It is unnecessary for me to say that my duties as Local Secretary have prevented me from carefully preparing an extemporaneous speech for this occasion. I shall look to the Council, my associate officers, and to the various committees to carry on the real work of the Association.

A handsome and well-constructed bouquet consists of flowers of varied colors, which you represent. I, as President of the Association, consider myself as only the twine which binds you together and keeps each one in his own proper place. [Applause.] May we remain thus united until next year, when we meet in that city where our good work shall be forever united in Brotherly Love. [Great applause.]

The Committee escorted Mr. Payne to the rostrum, and Mr. Mayo, explaining the absence of Mr. Searby, First Vice-President-elect, said:

Gentlemen, we have the honor to present your Second Vice-President, an earnest worker in the cause of pharmacy, Mr. George F. Payne, of Georgia. [Applause.]

Mr. Payne: Mr. Chairman and Fellow-members and Friends of the American Pharmaceutical Association: I thank you for the honor you have conferred upon me. When I arrived in St. Louis on Sunday morning and viewed the magnificent depot of our western metropolis, and then wandered over the streets, a lone Georgia "Cracker," far from home and friends, with not a single acquaintance, I felt very lonely; but as I wandered on I finally reached a section of the town where there were signs of a busy industry, and I looked up and saw a sign which read, "When looking for Mules, don't forget us." [Great laughter.] And I remembered the fact then that St. Louis was the largest mule market in the world, and that Atlanta was the second largest, so I immediately felt I was in the midst of my friends [applause], and that I might take it as an omen of good luck.

The duties of Second Vice-President are not onerous, but as far as they go I promise to perform them to the best of my ability. But I trust you will not regard me as an old farmer friend of mine, who once addressed an agricultural convention in my country, was

regarded. He went on to tell them how much of a farmer he was; he said he had lived as a farmer and mingled with farmers so much all his life that he felt as if he had been born in a corn-row. An old farmer back in the crowd cried out, "A punkin', by G—!" [Laughter and applause.] As I have always considered myself a druggist, perhaps the application will fit.

Again I thank you, gentlemen, for the honor you have conferred on me.

The committee escorted Mr. W. S. Thompson to the chair, and Mr. Mayo said:

Ladies and Gentlemen: I would like to make you acquainted with a gentleman you have never met before, but who, I can give you the most positive assurance, will become a very valuable officer of the Association—Mr. W. S. Thompson, of Washington, your Third Vice-President. [Applause.]

MR. THOMPSON: *Mr. President, Ladies and Gentlemen:* I thank you most sincerely for this honor which you have conferred upon me by electing me to this office—I think for the second, perhaps the third time. It is no small tribute to one's worth to be selected by those who know him for places of distinction and honor. But I really begin to feel now as though I was getting to be a chronic office-holder. [Laughter.] I don't know whether this arises from the fact that I come from an office-holding community or not [laughter], but I think it is time that I was making way for somebody else—time we were having some new blood in the Association—and all I can say to you now is to express my high appreciation. Don't understand me as belittling the position to which you have elected me. I appreciate it as highly, perhaps, as my friend Mr. Whelpley does his honor in receiving the highest office you can bestow upon him, and who has expressed his gratitude to you in a way beyond my power. But if he will allow me to hand to you the bouquet which he so fittingly presented, why I will offer that as my own. [Applause.]

The committee escorted Mr. Rapelye and Mr. Lowe to the chair.

MR. MAYO: Gentlemen, we present to you two only of the newly-elected members of the Council, the other member being absent. I am reminded in thinking it over that Mr. Rapelye has been almost as much of an office-holder as Mr. Thompson. Mr. Thompson's remarks reminded me of a story told by my friend John Allen, of Mississippi—"Private John Allen." He was making a speech in his district once, and he was told that an old negro woman wanted to see him, and after the speaking he hunted her up and she said to him, "Mars John, you look jes' like yo Pa, an' you got the same offis, too. Yes, sur, you always got de same offis your Pa had." "What's that," he said; "I don't remember it." "Why," she said, "he always wuz a can-di-date." [Laughter.] Gentlemen, we present Mr. Lowe and Mr. Rapelye.

MR. LOWE: Gentlemen, the new members of the Council feel very much impressed with the honors you have put on them. The wisest king of Israel said, three thousand years ago, that in a multitude of counsels there is safety, and we hope we shall add a little to the value of the Council of the Association. [Applause.]

Mr. Whelpley took the chair.

THE PRESIDENT: I am informed, ladies and gentlemen, that our Secretary and Treasurer and our Reporter on the Progress of Pharmacy are so permanently installed that they are no longer subjected to that process annually.

The Secretary informs me there is no other business on the table, so I will announce some delegates before we adjourn:

As delegates to the meeting of the National Association of Retail Druggists, I will name Mr. F. W. Meissner, of La Porte, Ind., chairman; Mr. J. W. Gayle, Frankfort, Ky.; H. F. Hassebrock, St. Louis; W. L. Dewoody, Pine Bluff, Ark., and Thomas Stoddard, Buffalo, N. Y.

As delegates to National Wholesale Druggists' Association, Chas. Holzhauer, of Newark, N. J., chairman; A. R. L. Dohme, of Baltimore, Md.; Leo Eliel, of South Bend, Ind.; E. G. Eberle, of Dallas, Texas, and Caswell A. Mayo, New York.

These delegates are announced at this time because the meetings of these Associations will be held in the near future.

MR. GOOD: Mr. Chairman, it is customary to approve the minutes of this session, but t is not practicable at this time, and I move that the reading of the minutes of this session be dispensed with.

The motion was seconded by Mr. Hallberg, and carried.

Mr. Sayre (of N. J.) moved that the Association do now adjourn.

Mr. Hallberg seconded the motion, and the session was then adjourned.

CHAS. CASPARI, JR.,
General Secretary.

ELEVENTH SESSION—WEDNESDAY EVENING, SEPTEMBER 25, 1901.

President H. M. Whelpley called the Association to order at 8 o'clock p. m.

The General Secretary being absent, the President appointed W. L. Dewoody, of Pine Bluff, Ark., to act as Secretary *pro tem.*

The President read a telegram announcing the sudden death, that morning, of W. S. Thompson, Chairman of the Council. A memorial session followed, in which Otto F. Claus, H. F. A. Spilker, J. C. Falk, W. L. Dewoody and others paid tribute to the memory of Mr. Thompson.

No further business being presented, and the social session having been concluded, it was, on motion of J. C. Falk, seconded by Otto F. Claus, agreed that the Association do now adjourn to meet again at Philadelphia, Pa., in the month of September, 1902.

W. L. DEWOODY, *Secretary pro tem.*

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST (AND ONLY) SESSION—TUESDAY, SEPT. 17, 1901.

The Section was called to order at 3 : 45 p. m. by Chairman Rapelye.

The chair announced that if any delegates were present from other bodies to whom had been extended the privileges of the floor by the Association in general session, they would have the same privileges at this session.

Mr. Stedem was then asked to take the chair while the Chairman's Address was read, which Mr. Rapelye delivered as follows :

Fellow-Members : Pharmacy to-day is a wide departure from the methods in vogue when the formation of this Association was undertaken. Professional features were then coming into prominence and most of the commercial questions that confront us to-day were then unknown. Our present condition is at one and the same time one of advancement and retrogression.

During the life of this Association the advancement of pharmacy along professional lines has been far beyond the dream of the founders of this body. The commercial conditions governing the practice of pharmacy to-day are not as favorable to the comfort and contentment of the pharmacist as they then were, as no outside competition then existed, and commercial questions were the least of their troubles. But the growth of our country in commercial importance and the constant increase of the commercial spirit has affected pharmacy in common with all lines of trade, and its business side has grown to be an important problem in the conduct of our business. In most lines of trade and manufactures the commercial spirit is, and should be, paramount; but pharmacy, combining as it does both the professional and the commercial features, presents a problem that requires special treatment, and how best to foster and make prominent the professional feature, and educate the people up to the idea that pharmacy is a profession and not purely a trade, and at the same time give to the commercial side the attention which is necessary to the successful conduct of business, is a question that confronts us to-day and is likely to confront us for some time to come.

The formation of the Section on Commercial Interests by this Association established the fact that we recognize that pharmacy has its commercial as well as its professional side. It has been the contention of some critics of the Association that our time and attention was too largely given to scientific matters and men, and that the pharmacist and

commercial and practical matters receive too little attention, but criticisms of that character usually come from those who are not well informed as to the scope of the Association's work. It is, I believe, true that when a Section devoted to the consideration of the commercial interests of the pharmacists was made part of the scheme of reorganization of this Association, those who planned the reorganization builded better than was at that time apparent. Originally planned to handle as best it might the ever-present question of cut prices, or at least to restrict the consideration of that question to its proper time and place in the work of the Association, it has by the formation of the N. A. R. D. had that question taken out of its hands, leaving the Section more time to consider the mercantile interests of pharmacy which are now forcing themselves upon our attention to a much greater degree than could have been foreseen at the birth of this Section.

That the work which this Section may do in the future will be an important part of the work of this Association, I believe cannot be questioned. It is perhaps true that the history of the work done by this Section up to last year had not been considered to be of especial value, and also that there has been a tendency to brush aside as unnecessary any special attention to commercial matters by this body. But at the present time, with commercial questions becoming as they are an important factor in the conduct of the business of pharmacy, this Association must, if it would maintain its place as leader in the affairs of pharmacy, recognize the importance of giving a fair share of its time and attention to commercial interests. I do not wish to be understood to underrate in the least the important scientific work that has been and is being done by this Association, and without which it must fall, but I do wish to emphasize the necessity for more attention to plans for the alleviation of the confused condition which exists in our business to-day.

If the growth of this Association has failed to be as large as might have been hoped for, I believe we have to look no farther than the fact that the idea has gone abroad that we care only for the scientific side and give little attention to the commercial.

It is not a matter of choice with the pharmacist that he is obliged to give so much prominence to the commercial questions, but the tendency of the times demand their careful consideration, and it is not a matter of choice, but one of necessity, that compels us to give much of our time to business details that we formerly employed in solving matters of professional interest, and what applies to the individual applies with equal force to the Association.

While it may be thought unwise to make the consideration of commercial matters a prominent part of the work of this Association, it would be simply good business sagacity to strongly enforce the fact that this Association is for the benefit of the pharmacists and all that tends to advance their welfare, and let it be its understood policy that it will, in every way possible, strive to enhance the interests of all pharmacists, whether they be members of the body or not. This is already the plan and purpose of the Association, but it is not so well understood as it should be.

It is not possible for any body of men associated together for any purpose to accomplish all that may be expected of them, neither is it possible for them to escape criticism, whatever their action may be. Criticism usually comes from those who never attend meetings or who fail to take an active interest in matters with which they find fault. It is expected by many that a body has but to adopt certain measures and the work is done, but these same critics should have long since learned that the organized body can only formulate plans which to become operative must have the sanction and support of individuals interested, and having such support, the wisdom of the measures is proven and they become the policy of the trade.

The troublous times of to-day are not due to lack of action on the part of this or any other body of pharmacists, neither can the cause of our troubles be well defined. It is not to the cutter, the proprietor, the manufacturer, the jobber, the dispensing physician or

to the prescribing by physicians of proprietary products that our troubles are due, but to a combination of circumstances, which embrace all of the causes above mentioned and many more that cannot be here enumerated. It could not be expected that pharmacy would escape being drawn into the whirl of the intense commercialism of the present time, and neither would we wish that it should, if that could be the means of increasing our business and profits; but, unfortunately, the reverse is true and we find profits growing less, and what we formerly regarded as business belonging exclusively to ourselves, being distributed into other channels. Pharmacy is as much governed by the laws of trade as is any other branch of commerce, and it cannot expect to escape competition (in some instances in its most vital part) from the grasping methods of the department store, which lays its hands upon anything which may in any way tend to advance its interests, without regard to the inherent rights of the smaller dealer. Logically, the smaller dealer has inherent rights, but commercially he has none that will be recognized by his mammoth competitor.

Of the cutter much the same can be said, as his methods are of the same order, and although we cannot endorse the means he takes to gain trade, the fact remains that if he did not display business activity in connection with his methods they would come to naught, which goes to show that business hustle is the price of success. There is no doubt in my mind that there is altogether too much time spent in whining about the cut-rate evil, and the same amount of time devoted to the development of business would result to the benefit of many pharmacists who, while they bemoan the cutter's presence in their midst, become cutters themselves and foolishly cut prices in the line of legitimate pharmacy, where there is no necessity for it, and lose the opportunity to get good prices for goods which should not be cut and need not be.

Many pharmacists seem to forget that they render any service when dispensing prescriptions beyond that rendered by the ordinary merchant, and they fail to charge for the time and skill for which they are entitled to a fair remuneration.

Times are changing, and the business of pharmacy is changing with the times. Conditions, various in their kind, are affecting our business; domestic remedies and crude drugs are much less called for than formerly, proprietary medicines having displaced them to a great extent. The physician contributes his share to the changed conditions, for instead of ordering the recognized remedies of the United States Pharmacopœia, he orders some compound with a fanciful name of which he knows nothing except what he has been told by some smooth individual who tells him of the wonderful advantage it has over preparations dispensed by the pharmacist. Of the character of the house introducing the remedy he is totally ignorant, but yet he is induced to order the remedy and the pharmacist is obliged to stock it, its use is continued for a time until another oily-tongued ambassador puts in an appearance with another remedy which is new and appeals to the doctor as an improvement on the first, and he takes up the new one, and so on *ad infinitum*. It has sometimes been my thought that if pharmacists, through their local organizations, would refuse to stock these preparations, and let it be known to the physicians that they did so refuse, that a long step toward solving this part of our troubles would be taken. I believe that the time is fast coming, and in fact is now here, when we will have to assume the aggressive in dealing with this and other questions with physicians. I do not by any means feel that any aggressive action taken should be of an offensive nature, but rather in the line of educating the physician to the fact that we are competent to do many things that he has come to think that we are not competent to do, through having been told so by interested parties. The mere assertion that we have competency will accomplish nothing, but a persistent campaign must be instituted and proofs of skill be shown until he yields by the very power of persistence. It is somewhat the fault of the pharmacist that this condition has attained the position that it holds to-day, but with strength to assert and maintain our rights the physician will soon come

to respect us the more for asserting them. Unless we do take a firm stand, the dispensing physician will take from us what little remains of our prescription business, and our business will soon degenerate into a mere buying and selling of proprietaries, with the few domestic remedies and supplies demanded by the public, and whatever side lines we may find profitable.

Through the importunity of houses who do not care to sell their products to pharmacists, the physician is being induced in many cities and towns to dispense his own medicine, thus taking from us the vital part of our business and leaving us little but the crumbs for our support. Not only tablets, but syrups, elixirs, cough remedies, tonics, in fact, almost any form of medication with blank label, in form for quick dispensing, is offered to him and he is told that the pharmacist renews his prescriptions without his order, and if he dispenses himself the patient must come to him for a renewal and he can charge his office fee. The tempting bait dazzles him and the further argument is used that the pharmacist substitutes, counter prescribes, charges extortionate prices, in short, is little better than a rogue, and under such tuition the physician quickly comes to lose confidence in all pharmacists, and as a result he does not write a prescription unless compelled to in order to supply a need for an urgent case. When brought down to actual facts it is with the physician almost purely a business proposition and an example of commercial medical practice.

Here we have more material for an aggressive campaign, and the question arises, do we not by keeping quiet give tacit acquiesence to these aspersions on our character and ability?

However the matter may be looked at, the cause of our troubles must give us some concern and the effect concerns us vitally. Possibly by the same process of evolution that helped to create these conditions by the over-doing now going on there will come about a return to former methods and the pharmacist thereby regain his former prestige.

The public must be treated with a different remedy, and the only one which promises results is to be found in their education up to the fact that medicine is not mere merchandise and is not sold as such, and that in order to secure favorable results from medicine it should be procured of the pharmacist who is fitted by education to dispense it with skill and accuracy, and for that skill should be paid a fair remuneration.

The public have not as yet become educated up to that point, and they buy medicine much as they buy ordinary merchandise, where it is offered at the lowest price, without regard to quality. It seems to us absurd that it is possible such a condition should prevail, knowing as we do the importance of skilfully prepared remedies in combating disease, but the cause is largely to be found in the present deceitful methods of advertising, whereby the people are led to buy without discrimination or judgment.

Such education can be accomplished only by persistent effort, but with the ever-increasing intelligence of the people it is probable that the desired result will ultimately be attained.

It is evident that returns commensurate with outlay and labor are not derived by the pharmacist to-day, and there is no indication of improved conditions in the near future. The constant increase in the number of stores is more or less responsible for this fact, yet there are always those who think there is a chance for success, and the constant division of trade lessens the income derived.

If rightly handled, the sale of one's own remedies and toilet goods may be made to afford a liberal profit, but these goods should be prepared by ourselves, and not by some manufacturer, with a label denoting that they are your individual production. To whatever the pharmacist attaches his name as a producer he should, in fact, produce, as he assumes a responsibility for such products, and therefore should know positively every detail of their production. Profits, however, in this class of goods may prove to be resultant losses, if undue urging of the customer be indulged in; for many of our patrons,

having been lured by glowing advertisements into the belief that the remedy called for is the one just suited to their needs, are loth to accept anything "just as good," and, if induced by urging to accept yours, are, on second thought, likely to feel dissatisfied with their purchase, and the consequence is the possible loss of a customer. Careful and intelligent judgment is necessary to the successful handling of your own goods, and, if they are so handled, a profitable trade may be built up.

Advertising is one of the most perplexing questions with which we have to deal, but some form of advertising is as necessary to the pharmacist as it is to other branches of trade. In whatever form it be done, I appeal for clean methods, without deceit or exaggeration. Whatever method is adopted should be carefully watched, and failure to produce results is evidence of the necessity for a change of method. The first essential to success is to be looked for in the store itself, as even liberal advertising cannot attract business to an ill-kept store.

No one will attempt to deny that great progress has been made in professional pharmacy, and it has not been accomplished without constant study and application; and our treatment of the commercial problems that surround us must be upon the same lines. We must not expect that the vexed questions of the trade will solve themselves, but if overcome, it must be by untiring application to the devising of ways and means for their extermination; and, if we apply ourselves to the task, success will eventually attend our efforts,

So much has been said and written concerning the adverse circumstances surrounding our business, that many have come to believe that no remedy will ever be found to alleviate present conditions; but persistent and well directed efforts will overcome almost any difficulties. What is needed is patient and united effort against our common foe.

We can conquer if we will, and conquer we must.

The chair stated that, without objection, the address just read would take the usual course, and it was so ordered.

Mr. Rapelye resumed the chair.

The chair stated that the next order of business was the report of committees, and called attention to the report of Delegates to the National Association of Retail Druggists, which had been referred to this Section for action at the general session this morning. He explained that the report had been read in general session, and would be submitted for whatever action the Section desired to take. Discussion was invited, but without response, and the report was referred to the Publication Committee.

THE CHAIRMAN: Gentlemen, we have with us to-day the Secretary of the National Association of Retail Druggists, Mr. Wooten, of Chicago, and we will be pleased to hear from him at this time.

Mr. Wooten said:

Mr. Chairman and Gentlemen: I apprehend that the time of the Section is too valuable for any desultory discussion, and since my attention has not been directed to any particular phase of the work, I shall say very little.

Three years ago, when it was proposed on the floor of this Association to endorse the formation of the National Association of Retail Druggists, having for its object the conservation of the commercial interests of pharmacy, it was plainly evidenced that that it was feared that this new movement would interfere with the prerogative of this Association. Whatever the National Association of Retail Druggists has accomplished within the last

three years—whatever it may have failed to accomplish in bringing about *all* the results that its most sanguine well-wishers hoped—there is no longer any doubt anywhere as to the rigid honesty, the sincerity of purpose, and the industry and tirelessness, of the men who formed it, the men who composed its two conventions that have been held since that time, and the men that have executed the policies that have been adopted. I think, Mr. Chairman, that the gentlemen here will agree with me when I say that no body of men has ever worked harder, more zealously, or more conscientiously, for the interests of pharmacy than has the National Association of Retail Druggists. And let me say here that I have been more and more impressed, since I attended the general session here this morning, with the identity of the aims of our two Associations. You are seeking to benefit the pharmacists by bringing them into a broader knowledge of the possibilities of pharmacy in ministering to the needs of suffering mankind. You are trying to elevate the profession of pharmacy by increasing that fund of knowledge that should be possessed in common by all workers in the field of disease: you are trying to bring the pharmacists of America up to that high standard to which they are properly entitled as the co-workers of physicians and surgeons. We, on our part, are trying to relieve pharmacists of the grinding, humiliating drudgery imposed by existing commercial conditions. These conditions, in the case of thousands of our fellow-class men, rob them of all opportunity for study, even of the most desultory kind. What we are trying to do is to give them a chance to seize upon and appropriate the facts which, year after year, the American Pharmaceutical Association is bringing to the knowledge of the world. The report of the Membership Committee this morning emphasizes this fact.

The efforts of the American Pharmaceutical Association to convince the druggists of the necessity of organization and the disadvantages under which they suffer by reason of their failure to fraternize with each other have been, it must be confessed, but poorly successful. This has not been for the lack of honest effort on your part, but in some measure at least has been due to a cause the Chairman referred to in his address—a misconception on the part of the rank and file of pharmacists as to the real character of the American Pharmaceutical Association. You are charged—unjustly, I know—with being ultra-scientific; you are charged with being out of touch with the common every-day man behind the prescription case; and this ignorance of the facts places you, to his mind, out of sympathy with him. We all agree that this charge is unfounded, but it exists in the minds of the pharmacists of the country. I am certain that no greater boon could be bestowed on the American Pharmaceutical Association than to correct this false impression, bring these men into your fellowship, and induce them to attend your meetings. In that event the Commercial Section of this Association would take on an importance it has never yet held, and the usefulness of the new Section on Practical Pharmacy and Dispensing would be increased a hundred fold.

Now, I have very little more to say, except this: If pharmacy is to continue to be a remunerative calling, the commercial side of the question must always have a champion. Scientific men may increase the fund of pharmaceutical knowledge; the field of pharmacy may be broadened; pharmacy itself may become more and more a blessing to mankind; but unless there is some power to secure for pharmacists the commercial advantages to which they are entitled, the physician, the surgeon, the chemist, will be remunerated as his abilities deserve, but a great many pharmacists will continue (as they are now doing) to eke out a mere existence. This emphasizes, of course, the necessity for the perpetuation of some influence which will secure to pharmacists the advantages they deserve. The National Association of Retail Druggists is trying to do what you have not succeeded in doing, viz: to convince the druggists of the country of the necessity of organization. Approaching pharmacists as we do from the commercial side—which, as I said before, whether they wish it or not, they are compelled to give the greater part of their thought to—our experience conclusively shows us we shall be able to convince them that the only

way to cure the evils from which they now suffer, and give them the advantages to which they are entitled, is through active, vigorous, effective organization. (Applause.) It is through this means that we hope to benefit both the pharmacists of the country and the American Pharmaceutical Association. We hope to break down the erroneous impression that the druggists have that the American Pharmaceutical Association is not in sympathy with them and not working for their interests. Gentlemen, I thank you for your attention. (Great applause.)

The Chairman stated that the reading of papers was now in order, and asked Mr. Stedem to read a paper upon the subject of successful methods of advertising which he had prepared.

Mr. Stedem then read the following paper, illustrating his subject at length by the exhibition of various clever advertising schemes and devices gathered from over the country and used with effect during the last year.

SUCCESSFUL METHODS OF ADVERTISING.

BY F. W. E. STEDEM.

To the Commercial Section of the American Pharmaceutical Association:

Gentlemen: It is my purpose at this meeting to exhibit for your inspection samples of circulars and other papers which have been actually used as advertising mediums during the past year. They have been collected from pharmacists in various cities and towns and illustrate methods in use in those neighborhoods. In connection with these, I have also submitted to you a letter delivered with samples of spices, illustrating a method of advertising spices by myself at various times:

Dear Madam: It is my intention to have you use our spices, and with that view, I enclose you a sample of powdered cloves and whole cloves, such as I sell every day on demand, because of the spice trade. You will find it very much to your advantage to examine these samples carefully and to give them a practical test; they are in every way superior to the ordinary spices on the market, and are an earnest of all the stock we keep of that kind.

Your attention is directed to the fact that the legitimate source and supply of spices is the drug store; that we have every method known to science whereby we can determine the purity of the material and, because of this advantage, you can buy with the assurance of getting the best always that can be had.

We do not wish you to think that cloves and spices is all that we have to sell. We direct your attention to our entire stock of drugs, remedies and sick-room supplies. It will be much to your advantage to favor us with your prescription work, assuring you that it will receive such attention as will insure best results. Our prescription department is conducted in such a manner as to eliminate errors, and our reputation in the past is sufficient guarantee that you will get what you want and that only.

Our prices on all things are so equable and just as to command your attention.

Very truly, F. W. E. STEDEM.

These letters were always accompanied by samples of sufficiently large quantity to be used practically, and to enable the persons trying them to determine the quality of the spices sent them. Of course, to make this effective, it must be kept up. To send one sample of a spice and not let

your customer hear from you again for six months on the subject, would be of very little benefit; but by keeping up the distribution of samples and by constantly reminding prospective buyers of the advantages you can offer, because of the superior quality of the goods you have to sell, you can depend upon a very material increase in the demand for that class of drug merchandise.

There is no good reason why druggists should not supply all the spices the public consumes. If the people's attention is constantly directed to the fact that the prices are nearly as cheap as the much poorer quality of material they have been buying, it seems but reasonable that they should quickly comprehend the advantages offered, and I am assured by many persons who have had experience in the establishment of a spice trade that once the trade is gained, it can be kept. This assertion tallies with my own experience.

While on this subject of advertising, it occurred to me to outline an experience I have had in the sale of tablets and tablet triturates among physicians; and I think I can unhesitatingly make the assertion that tablet triturates and their use among physicians have had their greatest day, and that it will not be long until we will see their gradual decline and final abandonment by the majority of the physicians of the country.

The one thing that I have observed continuously, in a rather extended business of some five years past, is that physicians do not buy expensive remedies in tablet form. In the past year we have sold to physicians, regular patrons of our establishment, some twenty thousand tablets of acetanilid, ranging in size from three to five grains. During the same time we did not sell a hundred phenacetin tablets. I have observed this difference—that they will prescribe for the patient a dozen five-grain phenacetin tablets and send the patient to your store with the prescription, but will themselves buy one hundred acetanilid tablets, and, if needed to renew the prescription in their office, will give the acetanilid, for the sole reason that it costs less. This same observation holds good with reference to the sale and prescribing of all the more expensive remedies, the proportion of sale and demand being about the same. This leads me to the conclusion that the use of tablets is simply a matter of convenience, through a not very well defined idea of its necessity to hold a patient, and that it will of itself die out without any antagonism on our part as pharmacists.

While on this subject of tablet triturates, it might be well, perhaps, to again call attention to the fact that it is very injudicious on the part of the druggist to antagonize a physician because of his dealings in tablet triturates or compressed tablets. Almost all of them write some few prescriptions, and, by not antagonizing them on this subject, you can undoubtedly secure some of these to even matters up. You at least have a better chance if you remain friendly, than if you antagonize a man openly

because of that kind of work. Why not sell the physician all the tablet triturates and other things that he may need? If you sell him a tablet triturate at a price that will command his patronage, you will undoubtedly be able to supply him with his clinical thermometers, his catheters, his ligatures, his drainage tubes, his needles, syringes, stethoscopes, and almost everything that he requires for the outfitting of his office or bedside work. A very little energy on the part of the druggist will enable him to so fit himself in stock of this kind as to be able to meet almost all of the demands of the business, and to add a profit which is worth the time to secure.

THE CHAIRMAN: Gentlemen, the paper is before the Section. What is your pleasure? If there is no discussion, it will take the usual course.

MR. HYNSON: I only want to say a few words, to set the retail druggists an example in discussion, because I want them to say something in my Section on Practical Pharmacy and Dispensing when it meets Thursday.

So far as I am concerned—and I say it here a little more boldly than I do at home—I think the idea of soliciting the physicians' trade is all right. It belongs to the druggist, and he ought to get it. And when he gets it, he gets not only his prescription business, but his general trade—his family trade.

In my store, we have lately undertaken to examine our supplies of spices and the like, and to certify to their purity to the customer. A gentleman here says he saw a large stock of preparations in my store put up in packages. That is true, and we sell an immense number of them—borax, bicarbonate of soda, Rochelle salt, and things of that sort—a regular drug trade: and there is very good profit in it. Our advertising is in the style of the package and the value of the goods. We do not do much advertising by sample with the customer. Our advertising in that way is chiefly with the physicians. We keep at them from morning until night.

MR. KNOX: I want to express my approbation of this paper. Mr. Stedem has certainly, I think, outlined an excellent system of advertising. I find from correspondence with some of the best advertisers in our part of the country that they rely on what I call personal solicitation of business, and Mr. Stedem's method may be said to be of that character. A circular letter and a sample of the goods desired to be introduced are placed directly in the hands of the party whose business is sought. As a rule, I think that kind of advertising is more profitable than journal advertising. I think he has struck the very best method for either city or country advertising, and I think his example, therefore, is worthy of emulation.

MR. HOLZHAUER: We have used samples with our customers very successfully. For instance, take Hood's Sarsaparilla. When a man comes in and wants Hood's, he gets it, but at the same time we give him a sample bottle of our sarsaparilla that we sell at fifty cents, and ask him to take it and try it. The result is, that where we used to buy in three-hundred-dollar quantities from Mr. Hood, we now buy by the half dozen. [Applause.] We have our liver pills, too, and every time a customer calls for a proprietary article we put in a sample of ours that we claim is better—I say my article is *better* than the other fellow's, not as good only. The customer will respect you more if you are not willing to let him wipe his feet on you. You can afford to take a stand against that sort of treatment, and he will respect and honor you for the way you do your business.

The chair stated that, without objection, the paper would be referred to the Publication Committee, and it was so ordered.

Mr. Beal being called upon, read the following paper upon the subject of control of prices by the manufacturers, explaining that the subject had been suggested to him by Mr. Lowe, of Philadelphia, chairman of the Section on Education and Legislation, before which Section it was designed to be read, but that as it seemed more appropriate after preparation to be read before this Section, Mr. Lowe had consented that it should be read here.

TO WHAT EXTENT CAN MANUFACTURERS OF PROPRIETARY ARTICLES BY AGREEMENTS AMONG THEMSELVES AND CONTRACTS WITH THEIR VENDERS CONTROL PRICE-CUTTING BY RETAILERS?

BY JAS. H. BEAL.

The investigation of this question involves a consideration of common law concerning contracts in restraint of trade, and concerning monopolies, and also of the special statutory provisions respecting trusts, which have been adopted in many of the states and by the Congress of the United States.

As the common law is presumed to prevail, except in so far as it may have been replaced or modified by statute, it will receive the first consideration.

THE ANCIENT DOCTRINE RESPECTING CONTRACTS IN RESTRAINT OF TRADE.

Originally the British and American Courts viewed with the greatest jealousy all conventions or agreements which sought in the slightest manner to restrict or limit commercial transactions, and the successful allegation of any such limitation or restriction in any contract was sure warrant for its annullment at the hands of the courts, both of law and of equity.

The ground upon which this interpretation of the common law was based was the broad ground of public policy, a basis sufficiently ample to give the courts a very wide reach in their discretion as to what agreements were proper and what improper.

Gradually it came to be seen that a reasonable amount of liberty in the making of contracts of this sort tended rather to the expansion and multiplication of commercial enterprises than to the reverse, and the pronouncements of the courts began to foreshadow the more liberal doctrine which prevails to-day.

THE MODERN DOCTRINE.

From the ancient doctrine of the common law courts that all contracts in restraint of trade were null and void on the ground of public policy, the present doctrine, as nearly as it can be gathered from the more modern decisions, is to permit a reasonable and partial restraint of trade by contract when founded upon valid consideration and not productive of monopoly in articles of general public usefulness, or upon which a public interest is engrafted.

Probably the following would be accepted as a fair statement of the common law as it would be recognized by the courts of the present time, and is quoted from Lawson's Rights, Remedies & Practice (Vol. 5, pp. 4008–4009), which cites the case of Hodge *vs.* Sloan, 107 N. Y., 244, and 1st Am. Rep., 816.

"The question as to the validity of an agreement in restraint of trade depends upon whether the restraint is such only as to afford a fair protection to the interests of the party in favor of whom it is imposed. Whatever restraint is larger than the necessary protection of the party is oppressive on the other party, without any countervailing benefit, and being injurious to the interests of the public, is void on grounds of public policy. On the other hand, a contract in restraint of trade is valid if it imposes no restraint upon one party not beneficial to the other, and was induced by a consideration which made it reasonable for the parties to enter into it."

Just what contracts would be considered reasonable and what unreasonable, within the meaning of the authority just quoted, must be determined by the circumstances of each particular case.

Thus a bond by an apothecary not to set up business within twenty miles of a former location, and a contract by an attorney not to practice within six miles of a certain point, have been held to be valid, while a contract not to practice dentistry within 200 miles of a certain place, and another not to operate a steamboat upon any of the waters of California, have been declared to be unreasonable, opposed to public policy, and void.

THE QUESTION OF PUBLIC INTEREST.

The question whether or not the business which is sought to be restrained is one which has a public interest engrafted upon it, is a most important element in determining the validity of the contract, as the following authorities will show:

"All compacts to elevate or depress the market are injurious to the public interest and in restraint of trade. When such a purpose is apparent it strikes the agreement with nullity: whether the design is to bring the price of any commodity to a point below its value in fair and open market, or to raise it above its true worth, the illegality of the combination is the same." (A. & E. Encycl., 1st Ed., Vol. 9, p. 895.)

"An association formed for the purpose of increasing the price and decreasing the production of a commodity of general use, such as candles, is contrary to public policy, and a claim based upon the enforcement of the agreement by which the association was formed can receive no aid from a court of justice." (Emery *et al. vs.* Ohio Candle Co., 47 O. S., 320.)

When an association of salt manufacturers agreed that all salt produced by its members should become, when packed, the property of the association, whose committee was to fix the price and grade of the product,

and provide for its delivery and transportation, the members not being allowed to sell salt at the factory except at retail, the agreement was held to be in restraint of trade and void. (Central Ohio Salt Co. *vs.* Guthrie, 35 O. S., 666.)

A corporation organized to gather and supply news to newspapers, etc., is engaged in a business upon which a public interest is engrafted, and can make no distinction with reference to newspaper publishers desiring to purchase such news for publication. A provision in the by-laws of such a corporation, and in the contracts made by it, that its members should not receive and publish news from competitive companies, is void as tending to create a monopoly. (Inter-Ocean Pub. Co. *vs.* Associated Press, 83 Ill., App. 377, 56 N. E. Rep., 822. Citing People *vs.* West. Union Telegraph Co., 166 Ill., 15; 46 N. E., 131. Munn *vs.* Illinois, 94 N. S., 113. Smith *vs.* Telegraph Co., 32 Hun., 4, and 42 Hun., 454.)

From the preceding decisions and judicial dicta it will be observed that in businesses upon which there is engrafted a general public interest, as in the supplying of salt, candles, and news, and doubtless in the case of all other commodities of the same general nature, the courts will view with jealousy and construe with strictness all conventions tending either to the enhancement of price or the curtailment of production.

THE RULE AS TO CONTRACTS RESPECTING ARTICLES OF A PROPRIETARY NATURE OR PROTECTED BY PATENT.

A more liberal rule seems, however, to apply to contracts fixing the price, or regulating the production of articles of a proprietary nature, or articles protected by patent or copyright, leading us to the conclusion that a reasonable restriction upon the production and distribution of such commodities will be permitted and upheld by the courts.

For example, "An agreement between individuals who have formed themselves into a corporation for the purpose of manufacturing and selling a certain patented article, and by the terms of which a uniform price is fixed for the sale of the article by the members of the company, which price could only be charged by the company, but which puts no restraint upon the amount of production or sale of the article by the members of the company, is not void as being in restraint of trade or against public policy." (A. & E. Encyclopædia, 1st Ed., Vol. 3, p. 885, Cent. Roller Shade Co. *vs.* Cushman, 9 East Rep. (Mass.), 560, S. C., 9, N. E. Rep., 629.)

The rule laid down in the case of the Central Roller Shade Co. just cited leads naturally to the decision in the celebrated case of Jno. D. Park & Sons *vs.* National Wholesale Druggists' Association, decided in 64 N. Y. S., 276, and affirmed in 66 N. Y. S., 615, the syllabus of which is as follows:

"Where a number of persons variously carrying on separate businesses

constituted an independent company, and by agreement among themselves refused to sell certain patent medicines owned and manufactured by some of their members, unless the purchaser would comply with certain rules of the association, such agreement was not unlawful or in restraint of trade, but proper as a protection to inventors' rights." (Am. Dig., 1900, B., P. 938. Citing Walsh *vs.* Dwight, 40 App. Div., 513; 58 N. Y. S., 91. Lough *vs.* Outerbridge, 143 N. Y., 271, etc.)

In this case (Park *vs.* Nat. Wholesale Druggists' Association) the Court says: "It is lawful for men to co-operate to obtain fair prices for their goods; further that it is lawful for manufacturers to provide means for obtaining information as to the acts of firms whom they suspect of violating any proper agreement in regard to the sale of proprietary drugs, and to communicate the same to their associates. It is also lawful for a manufacturer to fix a price at which his goods shall be sold, and for him to refuse to sell to any person for any reason, however capricious, any goods manufactured by him."

As will have been observed, the preceding decisions and quotations have dealt mainly with the right of manufacturers and others to combine together in associations to protect the prices of their goods.

We think the authorities quoted justify the statement in general terms that jobbers and manufacturers can safely combine to protect the selling prices of their products without subjecting themselves under the common law to prosecutions for conspiracy or the formation of unlawful combinations to produce monopolies.

POWER OF INDIVIDUAL PROPRIETOR TO LIMIT PRICE BY CONTRACT.

Now as to the power of the individual proprietor to limit by contract with the purchasers of his goods the parties to whom such goods may be sold, and the price to be charged for them when sold. Upon this point we have two recent decisions, one in England, the other in the United States, which, if sustained by subsequent decisions, will go very far to establish the full right of the manufacturer to control the price of his goods until they have passed from the retailer into the hands of the consumer.

The English case is that of Carrington *vs.* Elliman & Sons, decided by Justice Kekewich in the Court of King's Bench. Elliman & Sons had sold to Carrington a quantity of their embrocation, exacting from the latter party a contract to resell the embrocation only at a certain price, and to exact from their vendees a like contract to resell at the price fixed by the maker. Carrington kept the contract as to price, but failed to exact a similar contract from their vendee. Whereupon Elliman & Sons brought suit to enjoin the defendants from further violation of the contract, and for damages sustained by the prior violation. The defendants, having attacked the validity of the contract as being in restraint of trade and void, the court sustained it in approximately the following language:

"The plaintiffs were not bound to sell the embrocation at all, and they were not bound to manufacture it. They were at liberty to do as they pleased with it after it was manufactured, either to hold it at such a price as would prevent any sale at all, or so low that it would not pay a profit. Messrs. Carrington were minded to purchase the embrocation at wholesale, and to sell it at retail, and Messrs. Elliman made it a bargain with them that they should not sell it below a certain price, and further, that when they sold to others, they should insist and procure that those others should on their part enter into an agreement not to sell below certain prices. The latter part of the agreement had been broken. It could not be contended that Elliman had not the right to fix the price at which they would sell to Carringtons; then why should they not be at liberty to make a farther bargain with Carringtons that the latter should not sell below a fixed price?

"In one sense such a contract was in restraint of trade, but no more so than a resolution of the Ellimans to longer manufacture and sell their embrocation, which they had an undoubted right to do. There was no warrant for calling public policy into the transaction."

The court held the defendant below liable for nominal damages, the only damages proved, and costs. It, however, denied the application for injunction, on the ground that it could not be applied to past transactions, and that the plaintiff could sufficiently protect himself against future violations by refusing to supply his goods to the defendant.

The American case referred to is that of Garst *vs.* Harris, 58 N. E. Rep., 174, recently decided by the Supreme Court of Massachusetts, and generally known as the Phenyo-Caffein case. In this case the plaintiff, Garst, sold to the defendant, Harris, a quantity of the proprietary medicine known as Phenyo-Caffein, at the same time notifying him that the conditions of the sale were that they should not be resold for less than 25 cents per package. The defendant having violated this condition, suit was brought to recover $21.00, the sum named in the contract as liquidated damages. The defense argued that the contract was void as in restraint of trade, and that the damage sought was in the nature of a penalty. Both defenses were over-ruled by the court, and judgment for the amount claimed, with costs, was allowed.

Again, in the case of Walsh *vs.* Dwight, 40 App. Div., 573 (N. Y.), where a manufacturer sold saleratus to jobbers at certain rates, in consideration of the latter's agreement not to sell the article or other brands of the same at less than the stipulated price, the contract has been held good.

FORMATION OF THE CONTRACT.

If it be conceded, and the authorities considered seem to indicate that it must be, that proprietors can lawfully bind their vendees to maintain a stipulated price upon goods supplied to them, and since the conditions of

trade are such as to render it inexpedient to exact a written agreement signed by both parties, in every case, it becomes important to determine what act or acts constitute assent on the part of the vendee to the terms of such a contract.

Will it be sufficient, as in the so-called "Worcester Plan," to supply the goods accompanied with a notice that the goods are sold upon the conditions embraced in the contract which accompanies them, and will the acceptance of the goods, along with this notice, constitute such an acceptance of the contract as to make the vendee liable for liquidated damages in case of non-observance of the expressed conditions?

It is an elementary principle of law that a complete contract consists of an offer on one side, and an acceptance on the other, and that the contract dates from the time of the acceptance, and not from the time of the offer.

In the case of bills of lading given by common carriers, the general rule seems to be that the act of accepting the bill of lading by the shipper raises the presumption that the latter assents to the conditions plainly printed thereon, whether the actual reading of these conditions can be brought home to the shipper or not. It is sufficient merely that the conditions are clearly stated in the bill, and that the shipper has the opportunity of acquainting himself with them.

This presumption, however, may be rebutted by circumstances which would render it unlikely that the consignor could have actual knowledge of the bill's contents, as where it is delivered in a dark room, or the conditions are printed on the back of the bill, or in very fine type, or are concealed by a stamp pasted over them, or where the shipper is given to understand that the paper is a mere receipt, and the like. (A. & E. Encyc., 2d Ed., Vol. 4, p. 515.)

While some courts seem to hold that the question of consent is always a matter of fact for the jury, the weight of opinion seems to be as stated above.

Reasoning from analogy, therefore, it would seem that the conditions of sale furnished with goods or sent with the invoice would be held to be accepted, if the consignee proceeds to dispose of the goods as his own.

CONCLUSIONS.

If we have comprehended aright the authorities and cases which we have examined, the following conclusions may be taken as fairly expressing the present common law doctrine upon the questions in hand:

First. Manufacturers and jobbers may lawfully associate themselves together, and by contract establish a price upon proprietary or patented articles supplied by them.

Second. Such contracts are not void as in restraint of trade, nor will the refusal of the parties to supply goods to those who decline to follow the

rules of the Association in regard to price render them liable to prosecution for conspiracy.

Third. The manufacturer of a proprietary medicine may bind his vendees by contract to sell such medicine at the stipulated price, and to exact a similar condition from all to whom they may re-sell.

Fourth. The enclosure of a plainly printed contract with the goods stating the conditions upon which the same are sold, and a similar notice sent with the invoice, constitutes a sufficient notice to the purchaser of the conditions upon which he can acquire ownership of the goods, and a re-sale of the goods is evidence of his acquiescence in and acceptance of the provisions of the contract.

Fifth. The so-called "Worcester Plan" seems to be valid and enforceable in all of its essential features, and manufacturers and jobbers who do not wish to comply with it will have to seek some other excuse than that of illegality.

The chair invited discussion upon the paper, and Mr. Sheppard said that in that connection he desired to offer the following resolution:

Resolved, That the American Pharmaceutical Association hereby endorses the so-called Worcester Plan, and recommends the adoption of the same by the manufacturers of proprietary articles.

MR. HOLZHAUER: Before that is put, does the Worcester Plan forbid anybody from buying directly from the manufacturer?

THE CHAIRMAN: As I understand, it does not. It simply refers to the contract.

MR. MAYO: Can that be passed by this Section the way it is worded?

MR. SHEPPARD: Yes, sir: I think I am right in thinking that the Section can pass the resolution. If, at the general session which always follows the Section meetings, any action has been taken which the Association as a whole does not approve of, then the Association as a whole can repudiate it. This is commercial work. In the Scientific Section they have scientific work, and in the Educational Section educational work. If the Association does not approve this resolution it can, on next Saturday, at the last general session, say so.

MR. MAYO: This will be setting a new precedent. Last year at Richmond it was distinctly ruled by the presiding officer of the Section on Education and Legislation that we could not endorse a resolution brought before us relative to a recommendation presented by the Board of Trade of the city of Richmond regarding the question of adulterations. It has been customary to take the stand that no Section can speak for the Association; that where a Section desires a certain thing done, it shall be recommended to the Association.

MR. SHEPPARD: I will change the phraseology, then, so that we shall recommend that the Association endorse this plan.

Resolved, That the Commercial Section recommend that the American Pharmaceutical Association endorse in general session the so-called Worcester Plan, and recommend the adoption of the same by the manufacturers of proprietary articles.

MR. BEAL: I have not the great misfortune to be a retail druggist myself, nor do I

know very much about the policy of the National Association of Retail Druggists, except in a general way; but in my opinion, if you do not stand by this Worcester Plan and by the N. A. R. D. you are making the mistake of your life. It is possible this contract may have to be modified from time to time in the different States. At first I was rather doubtful of the ability to restrict the price of these articles after they left the manufacturer, but I was convinced in spite of myself by the decisions—and I could quote dozens of others besides those I have quoted. I think this is the most sensible proposition ever made to the retail druggists for the control of prices, and if you do not give it your thorough support, from seaboard to seaboard, you are making a great mistake. [Applause.]

MR. BARTELLS: I would like to have someone conversant with the Worcester Plan state just what it is. Some of us are not familiar with it.

Mr. Beal was asked to give the explanation.

MR. BEAL: I do not know that I can go into a full explanation of the contract, but it simply amounts to a statement in very plain English that these goods are sold expressly upon the condition that they shall be re-sold at the price marked upon the container, and in case of a violation of the terms of this contract that the seller has been damaged to the extent of $21—for the reason that damages would necessarily be difficult to determine before a court and jury in the ordinary way, and this is what is called liquidated damages to avoid that trouble. In case of a re-sale of these articles at a price less than the price named, the seller shall become liable in the sum named. There is also a condition that the purchaser, if he does not wish to keep these goods upon the terms of the contract, may return them; and also the further condition that he may return them at any subsequent time, in good condition, and receive back the price paid for them. That, as I remember it, is the contract in a nutshell.

There are some decisions, I confess, that seem to be in conflict with such a contract, but the general trend of the authorities is, that the manufacturer of a trade article has a right to say that as often as it is sold by a dealer in these things he shall sell it at the price fixed by him. He won't sell it to him unless he agrees to that. "That is the condition upon which I part with my property," he says, "and if you take it, you must take it subject to that condition."

MR. HYNSON: I would like to ask Mr. Beal if he has ever thought of the operations of the Inter-State Commerce Law in this connection?

MR. BEAL: Yes, sir, and I presume that might modify the contract to some extent, but just how far I would not like to say.

MR. HYNSON: Suppose it changes hands several times, who are the parties to the contract then?

MR. BEAL: I presume the party against whom suit would naturally be brought would be the man who first violated the contract. The manufacturer sells to A, who agrees that he will sell at a certain price, and that he will not sell to B at a less price; and if he does so, I suppose that he would be the man who would first be liable to suit—the one who first violates the contract.

MR. HOLLIDAY: As I understand the matter, the terms of sale are to be stated in the invoice. By accepting the goods under the terms of the invoice, the purchaser becomes a party to the contract. But suppose some one is disposed to supply these goods without an invoice, would the mere possession of the goods with terms marked on them make the holder responsible to the manufacturer for the stipulated damages?

MR. ANDERSON: The case which Mr. Beal has spoken of—the English decision—was decided on the idea that the firm knew that those goods were being sold under the price restriction. The firm showed that they did not receive a notice of the condition of sale, bu bought them in a roundabout way; but the court held they had knowledge of the conditions of sale, and that was sufficient. So, under the Worcester Plan, it is not necessary that the dealer should have served on him directly a notice of the conditions of sale In Ohio, the phenyo-caffein people had a case where the dealer claimed that he could not be subjected to the damages, because he had not been served with notice of the terms of sale; but before bringing suit in that case, the phenyo-caffein people served notice on that dealer of the terms of sale. Now, the retail trade of the country could be protected in the same way, through the workings of a price-restrictive plan. Through the local associations that have been formed, and will be formed throughout the country, the dealers everywhere could be served with notice of the terms of sale on such articles without any trouble. Mr. Beal has mentioned a number of decisions upholding the principle of price-restrictive plan, and he states there are many more to the same effect.

Another strong feature of the plan is the effect it will have on dealers to prevent suits. In New York, the Waterman Pen people, who are placing their goods on the market on a similar plan, applied for an injunction against a New York dry-goods concern for cutting the price on their goods. On the hearing, the dry goods firm was able to show they had never received notice of the conditions of sale, or were not familiar with them, and the injunction was denied: but the Court stated plainly that if the Waterman people had been able to show that the dry-goods firm had even knowledge of the conditions, they would have been liable. Upon the strength of that decision, they raised the price immediately, and have maintained it ever since. The actual existence of these price-restrictive conditions, when the dealer has knowledge of them, is sufficient. If the price-restrictive plan were adopted by the proprietors of this country, it would be easy for them to state on their goods that this bottle, say, is sold under the price-restrictive plan, not below. It would be easy to do that. Now when Congress acts in the interest of the retail trade of the country, the best thing this Association could do would be to lend its aid to the enforcement of this plan, which would be of such great advantage to the retail trade of the country. [Applause.]

MR. FEDERMANN: Would the adoption of this plan do away with the Tripartite Agreement? What effect would it have on that?

MR. ANDERSON: That matter will come up before the National Association of Retail Druggists, at Buffalo, next month, and will be acted on there, no doubt. My personal idea is, that the wholesale trade—the jobbers—will, of course, be considered in whatever is done. I do not believe there is a retailer in the country who, if he could get a dollar for a dollar preparation, and fifty cents for a fifty-cent preparation, would begrudge the jobber his profit on the goods. What the retailer wants to-day is to benefit himself. Then he is willing to give something to somebody else. But he is not willing to give everything to other people, and get nothing himself.

THE CHAIRMAN: Gentlemen, the resolution in its changed form is before you, and a vote will now be had upon it.

The question was put and the resolution adopted.

Mr. Mittelbach being next called upon, read a paper upon the subject of "Containers," as follows:

CONTAINERS.

BY WM. MITTELBACH.

One of the most disturbing elements between wholesaler and retailer is, and always has been, the charges for box, bottle, can or barrel used in the transportation of goods. These items have already been the cause of dispute and dissatisfaction, and will be until entirely eliminated from our bills; or at least reduced to actual cost. If jobbers and manufacturers will charge only first cost to the retailer, it will help matters very materially. 8 cents, 10 cents and 12 cents for pint bottles, and 15 cents, 25 cents, 50 cents and 75 cents for tin cans, is certainly not first cost. Such adjustment will, to a great extent, relieve the difficulty. We all know that these items must be computed in the cost of conducting business. Those parties that must use them in the transaction of business are certainly entitled to an amount equal to the actual cost, and the receiver of the goods ought to be willing to pay it. A better plan would be to simply add the cost of container to the cost of the article contained therein. This would completely hide this disturbing element, and in my judgment, settle the trouble completely. The items of boxes and drayage were always a bugbear to the trade, and the cause of much resoluting in conventions. Since these are eliminated from our bills no further kicks are made on that point. The shipper has wisely added the cost of boxing and drayage to his goods, and the retailer is satisfied and looks with complacency on the pile of boxes in the back yard, without regretting the immense cost of his kindling wood. This very objection to paying for container is the cause of the much-abused use of the paper carton. And if we are not careful, other troubles will arise in the indiscriminate use of these containers.

The gentleman was applauded upon his paper.

The chair announced that if there were no remarks the paper would, without objection, be referred for publication.

MR. HYNSON: I think this Section should pass a resolution recommending to the National Wholesale Druggists' Association that the plan proposed by Mr. Mittelbach be adopted, and that the cost of containers be added to the cost of the goods. I therefore move that it is the sense of this Association that the wholesale dealers should include the cost of containers in the charge for goods, without mentioning the same.

Mr. Bartells seconded the motion.

MR. STEDEM: It is customary in the cities to send back the containers, in many instances, and receive back the overcharge.

MR. HYNSON: I think that matter would arrange itself. I believe this would be a politic move for the druggists at large. I believe the most of them would like it. Of course, in cities where the wholesaler lives, it would not apply.

MR. EBERLE: I think this move would disarrange the market very much. You would not know the price of the container. Then again a plain can might be used for some items, and a jacket-can for another. The wholesaler would want to get as much for his

container as he could, and I believe it would take away the evenness of the market on the price of goods.

MR. HYNSON: The shipper would have to put them in shipable condition, of course. He would have to use containers sufficient for the purpose. The small amount of the container could be added to the price of the goods by the retailer, if we all had to pay for it. It would also improve the character of the containers. In many instances they are not fit for the use to which they are put. I would rather pay the price of new containers than return the container and deduct the difference. The goods come to you in mighty poor containers sometimes. Is that so in Philadelphia, Mr. Stedem?

MR. STEDEM: Yes, sir; that is true.

A MEMBER: The druggists of St. Louis have objected to the wholesalers charging a hundred per cent. profit on the containers furnished them. We do not mind a reasonable charge, but object to paying twenty cents for a bottle that only cost ten cents, or fifty cents for a can that cost thirty. This matter needs regulation.

MR. MAYO: Mr. Mittelbach, I believe, is quite willing to pay for the actual cost of the container, but we all object seriously to making the container an essential part of the transaction. We want it at cost. That, it seems, would meet the conditions here in St. Louis.

MR. MITTELBACH: My thoughts were of the small containers more than anything else —bottles containing salts or liquids. We are charged the full retail price for a pint bottle of from eight to twelve cents. That is more than the cost. There is a tendency among the jobbers to include packages. Some of them say packages included. But when we get a ten-gallon can of alcohol, at so much a gallon, and 75 cents for the can, it is grinding. That is a thing we do not like. If they include the cost of the can to them, and say $2.55 per gallon, can inclusive, nothing would be thought of it. That was my idea, to include all containers in the cost of the goods. If we should endorse this idea, I think we would soon settle this vexed question.

MR. HYNSON: I have written out my motion:

Resolved, That the Commercial Section of the A. Ph. A. recommends that the N. W. D. A. include the actual cost of containers in the charge for goods.

The motion was seconded by Mr. Stedem, and carried by a rising vote of 24 for the resolution to 9 against it.

THE CHAIRMAN: We also have another paper on some general aspects of commercial pharmacy, by Mr. Frank A. Partridge, of Maine, but as the hour is getting late I should be in favor of reading it by title and referring it for publication.

On motion of Mr. Mayo, it was so ordered.

The full text of the paper was as follows:

GENERAL ASPECTS OF COMMERCIAL PHARMACY.

BY FRANK R. PARTRIDGE.

"Where are we at?" is a question that may well be asked by any and all legitimate apothecaries throughout the country. What is the good of our Colleges of Pharmacy? What is the benefit of all the technical and practical knowledge there taught? Of what use are Boards of Pharmacy?

What is the good of vigorous and thorough examinations of the applicant for registration? Why is a greater degree of knowledge required of the apothecary of to-day than ever before? "What are we driving at?" and where are we "going to land?" These are a few of the questions which confront the practical and thinking pharmacist.

In years gone by the apothecary prepared most of the medicines the physician used in his practice; he made all the tinctures, syrups, solutions, wines, pills, infusions, decoctions, plasters, emulsions, and in many cases the fluid extracts. It was no hardship for him to make a batch of pills, fifty or even a hundred in number, upon a prescription of the physician. To spread a plaster was but the work of a few moments for the deft hand, and to prepare an infusion was a common thing, and took just as long as it does now. Pill-making is almost a lost art with the average apothecary. Pills and tablets come to us all prepared, and the physician selects from the list what he can get, not just what he wants; in times past he wrote a prescription for what he wanted and the apothecary prepared it for him, and each pill contained just the exact quantity of each ingredient. Can the same be said of all the pills and tablets that infest the market to-day? "Elegant Pharmaceuticals," sad to tell, are displacing old tried remedies, but the same physicians who prescribe these "elegant" preparations" finding, in an emergency, they do not produce the results anticipated, are glad to fall back upon some of the old-fashioned remedies, which still prove to them a "sheet anchor" in time of trouble.

I believe in progress. I believe the science of medicine has progressed, and that new and valuable remedies have been discovered, and that still others will be found; but I do not believe in juggling together either old or new remedies, or both, and giving them a name, which means nothing to the physician or pharmacist, or upon which no literature exists, except that written by the manufacturers of the same or some versatile writer employed by him for that purpose. It seems to me that in prescribing those empirical preparations the physician is forsaking the old and well-beaten path, and is pursuing a delusion from which, in time, he will experience a rude awakening.

The pharmacist as well as the physician is besieged by experienced and adroit traveling men, with beautiful colored pills and tablets, elixirs of this and that, wines of that and the other, with liquors, solutions, syrups and fluid extracts of things known and unknown, though possibly the manufacturer may think he has a knowledge of their virtues, and they are forced upon the apothecary, through the work of these "smooth and oily" detail men, with the physician, whose better judgment is ofttimes warped by the guileless manner of the well-trained exhibitor, and the doctor prescribes them. The dry-goods clerk, the boy who drives the butcher's cart, can "put them up" just as well as the skilled pharmacist. Again I ask, What is the use of your Schools of Pharmacy and your Pharmacy Boards?

Surely skill and science are not required to dispense such prescriptions. As a rule, I believe in not sighing for "good old times," but I do believe the good old time in the apothecary business will "quietly fold its tent and silently steal away" unless a halt is called on these "elegant pharmaceuticals" that are flooding the market, and unless many physicians are awakened to the fact that plain, well-tried and reliable remedies are still valuable. An eminent physician and surgeon once remarked to me, "Give *me* twenty-five or thirty of the old and well-tried remedies, *they* may have all the rest, and I'll produce equally favorable results."

Both physician and pharmacist should be up to date. The Pharmacopœia of 1900, the Dispensatory of same date, and our National Formulary are surely not ancient literature; yet I find nothing of these "new" (?) remedies in either. I am of the opinion if the formulæ of the National Formulary were brought particularly to the attention of the physician, it would fill a want with him which the man with a limber tongue and a fine-looking line of samples now supplies. Is it up to date prescribing a preparation because it looks well, smells well, tastes well, and the smooth man says will do all kinds of things? Is it up to date giving a patient a medicine because the drummer tells the physician it fits their class of cases, the preparation oftentimes containing a drug of which the physician knows nothing? Is it up to date and does it make the apothecary up to date to force the dispenser of drugs to load up his shelves with stuff that later becomes a "Calamity" after its worthlessness becomes known? Of course some of the preparations made from well-known remedies have become standard and are incorporated in the National Formulary, from which any intelligent and skillful apothecary should be able to prepare them for himself. Of these I have no word of condemnation, but if the myriads of patent and empirical preparations continue to increase, and the physician allows the smooth and oily man to think for him, the College of Pharmacy will be obliged to change its curriculum, and the Pharmacy Board step down and out, for the "Butcher the Baker, the Candlestick-maker" and their boys will be able to dispense these "Elegant Pharmaceuticals" composed of pretty pills, dandy tablets, scented elixirs, palate-tickling wines and the long list of other "stuffs" put out as remedies for all the "ills that flesh is heir to."

Augusta, Maine, August 17th, 1901.

THE CHAIRMAN: The next business is the election of officers for the ensuing year. Gentlemen, you will please make nominations for Chairman.

Mr. Stedem nominated Mr. F. W. Meissner, of La Porte, Ind., for Chairman, and Mr. Anderson seconded the nomination.

There was no other nomination for Chairman.

Mr. Anderson moved that the Chairman of the Section—as Mr. Meissner was now Secretary and would not want to vote for himself—be in-

structed to cast the affirmative ballot of the Section for Mr. Meissner for Chairman.

The motion prevailed.

THE CHAIRMAN: Gentlemen, the Chairman takes pleasure in casting the ballot of the Section for Mr. F. W. Meissner, for Chairman of the Section for the ensuing year.

The Chair announced that the next business would be the nomination and election of a Secretary, and called for nominations.

Mr. Mayo nominated Mr. F. W. E. Stedem, of Philadelphia, for the position, but the gentleman asked to have his name withdrawn.

Mr. Hynson nominated Mr. E. B. Eberle, of Dallas, Texas, and there were no other nominations.

Mr. Mayo moved that the Secretory cast one ballot electing Mr. Eberle, which motion prevailed, and the Secretary announced that he had performed that duty.

The Chair called for nominations for the three other members of the Committee on Commercial Interests required to be elected.

Mr. Mayo nominated Mr. F. B. Lillie, of Oklahoma; Mr. Knox nominated Mr. Mittelbach, of Boonville, Mo., and Mr. Hynson nominated Mr. C. L. Meyer, of Baltimore.

Mr. Mayo moved that the Secretary be directed to cast one ballot electlng the three gentlemen named, and the motion prevailed.

The Secretary announced that he had cast the ballot as directed.

The Chair named Mr. Hynson and Mr. Sayre (of N. J.) a committee to conduct the new officers to the Chair, which they did amid applause.

The new Chairman and Secretary were installed, and on motion of Mr. Sayre the Section then adjourned.

MINUTES

OF THE

SECTION ON PRACTICAL PHARMACY AND DISPENSING

FIRST SESSION—THURSDAY MORNING, SEPT. 19, 1901.

The Section was called to order by Chairman Hynson at 10:15 a. m.

Mr. Diehl was requested to take the chair while the Chairman's Address was read, which Mr. Hynson delivered as follows:

Colleagues and Fellow-Members: With a truly affectionate salutation, I would link my warmest congratulations. Not only to you, but to all the pharmacists of this beloved and grief-racked country, my salutation is made with best wishes, because of the hearty fraternal regard I bear to you all, because of the real interest I hold in you, your welfare and your happiness. My congratulations go out to the pharmacists of America, my brethren, because standing out in the fair light of truth, with even the halo of long ago framing the lives and histories of your fathers, you seem to be blessed and blessing.

At the dawning of this greater day, known as the Twentieth Century, in Columbia's realm, the department of pharmacy has upon its roll call, as will be shown when published, no less than one hundred thousand votaries. This same census report will exhibit an increase of capital employed almost startling, and, as compared with the totals of one hundred years ago, these data will stand strongly evidencing pharmacy's phenomenal progress. Yet no matter how convincing these figures may be, judge, please, by the knowledge of direct tradition or even personal experience, whether or not you should accept, as a class, the congratulations I offer, because of your increased numbers, because of the greater demand which forces the greater supply, because of your greatly increased capital and your improved facilities, because of your greater intelligence, and your better education. I congratulate you upon your higher scientific attainments and your more creditable ethics, upon the acquirement of the magnificent educational influences you have established and are maintaining, and, lastly, upon the greater help you offer humanity and the sweeter home-life you enjoy.

If congratulations are justly accepted by you as pharmacists, then a glorification should be yours as members of this Association, because in the strong fabric of influences which has lifted pharmacy to the higher station, run beautiful golden threads—they are the years of the American Pharmaceutical Association. Honor to the fathers! Truly, "they builded better than they knew."

I am anxiously and earnestly hoping that we shall, in a few years, all feel happily satisfied with the work and results of this Section. Naturally, it is very dear to me, as it has become, I trust, to at least a few others. It seems to be the very essence, the source from which our inner food supply is to come, and I beg for it your best and most helpful support. I must say it has had all possible help from officers and leaders; from press and noble patron. For this generous patron it must be congratulated. Dear Dr. Sander has given it not only recognition, but substantial aid. The prize he has offered must stimulate, and in the growth impelled, he will be honored. He does not boast of great wealth, but he has given freely; nor can I claim great ability, yet the very best I could conjure, and all the time I could possibly spare, have been given to this Section. Consequently I am sure I speak for Dr. Sander when I speak for myself, saying that nothing I have ever done without the pale of strictly personal matters has given me so much satisfaction and pleasure. It remains for you who have larger means and greater powers to go forth, sow and reap even a richer harvest than has been ours.

Effort has been made by my colleagues and myself to put before you a large amount of matter for discussion. Prof. Diehl will present the details of his work on "National Formulary Preparations," Mr. Stedem will bring before you the matter of packages and package goods, while I present a simple compilation of the prescriptions collected last year with the accompanying notes. I will also ask your consideration of the laboratory and dispensing observations that I may, if time permits, offer.

As a result of close observation and careful thought in connection with this work, bearing in mind the requirements of the hour, I would suggest to the members of this Association, engaged in retail business, that they enlarge and improve their laboratory operations and pay more and more careful attention to dispensing, offering as a practical means of doing so the consolidation of two or more stores into one. I will not discuss here the commercial side of this proposition, but will, however, positively assert that there is plenty of good, legitimate pharmaceutical work to be done, that must be done if one desires to be in the front rank to-day, or remain there to-morrow.

The address was applauded.

MR. HYNSON: Mr. Chairman: Taking into consideration my previous long reports, some may be disappointed in this, but it seemed to me it would be better to keep as far in the background as possible, this time; I fear I have, heretofore, imposed too much upon the good nature of the Association.

Mr. Stedem moved to refer the address for publication. Carried.
Mr. Hynson then took the chair.

THE CHAIRMAN: Gentlemen: It is my idea—and that of my colleagues, I think—that, while we have papers and are very glad to have them, we want to suggest matters that you may discuss. We shall take it as a great favor if you will make your notes as we go along, and be prepared to discuss the matters under consideration. Now I do not want to cut off discussion; if you will stick to the question, I will not do so; but I do not think it will help us if, when we start to discuss one question, we get off to something else. Just make straightforward statements about your experience and knowledge on the subject in hand, making any suggestions you can, and then, after we are through with that, we will be glad to hear you upon other subjects.

I am glad to introduce to you this morning, one of our younger members, Mr. Kaemmerer, of Columbus, Ohio. He has gone to a great deal of trouble to prepare an exhibit and a paper, which I am sure will be of interest to you.

MR. KAEMMERER: Mr. Chairman, Ladies and Gentlemen: The object of making this

exhibit is to show you what the man behind the prescription-counter is doing. He is the real pharmacist—the man who stands between the physician and the patient.

The speaker here presented the following paper, illustrating his subject by exhibiting and describing quite a number of pharmaceutical preparations, chemicals, etc., which he had carefully arranged upon a table before him:

HOW WE INCREASED OUR PRESCRIPTION BUSINESS.

BY WILLIAM KAEMMERER, PH. G.

Finding our prescription business in an unsatisfactory condition, we determined to do something to revive it. It was evident that we were not filling as many prescriptions as we ought to fill, although prepared in every way to do a good prescription business.

After thinking over several plans as to how we could best accomplish our object, we decided that the best and least expensive way would be to make personal calls upon the physicians, show samples of our work, and explain matters of interest in our prescription department. Accordingly, I filled a good-sized grip with samples, and went to work among the physicians.

My samples consisted mostly of galenical preparations, a few crude drugs and chemicals, and some extemporaneous preparations which required skill in compounding.

In order to make the scope and character of the work better understood, I will repeat in a general way the conversation I had with the physician. It must be borne in mind, however, that samples were shown and examined as the conversation proceeded.

After gaining an audience with the physician, and opening up my samples, I would explain the object of my visit as follows:

"Doctor, I haven't anything to sell, nor anything to give away, and I am not going to worry you with any new preparations or new cures. My object is to show what we can do in the way of fine prescription work, and in that way increase our prescription business. We manufacture a complete line of Elixirs. They are of the same strength and composition as those usually found on the market. We are in position to manufacture anything in this line that you may wish to prescribe. In order to show what they are like, I have brought a few of them with me.

This is our Simple Elixir, or Elixir Simplex. You will find this a most pleasant and agreeable vehicle. It is composed of sugar, water and alcohol, and is highly flavored with fresh oil of sweet orange. It is clear, colorless, and of a true orange flavor. We use this as a base for all of our elixirs. As a flavoring agent, we use nothing but pure, fresh oil of sweet orange, the best that money will buy. The reason you do not always get an elixir like this when you prescribe it, is because proper care is not always exercised in selecting the oil of orange. Oil of orange turns tere-

binthinate in odor and taste very readily, and when used in that condition will forever ruin an elixir.

This is our Red Elixir, or Elixir Rubrum. No doubt you have often prescribed it. It is nothing else but our simple elixir colored red. As a coloring agent we use nothing but cochineal, which is perfectly harmless. We never use aniline in any of our elixirs.

Our Elixir of Calisaya represents the equivalent in alkaloids of five grains of calisaya bark in each teaspoonful. It is useful as a simple tonic.

Our Elixir of Potassium Bromide contains ten grains of potassium bromide in each teaspoonful.

Our Elixir of Sodium Bromide also contains ten grains to each teaspoonful.

Our Elixir of Ammonium Bromide contains five grains to each teaspoonful.

Our Elixir of Ammonium Valerianate contains two grains of ammonium valerianate in each teaspoonful. In this elixir we have to a great extent masked the odor of the salt without in any way affecting its medicinal properties. This is done chiefly by neutralizing the valerianate of ammonia. Ammonium valerianate as found on the market is usually acid, owing to the escape of some of the ammonia. It is the valerianic acid which has such a disagreeable odor, and when neutralized with ammonia water the odor is almost completely overcome. Whenever we receive a prescription calling for ammonium valerianate, we are always careful to neutralize the latter before sending it out, and you will never have your patients complain about the disagreeable odor.

Our Elixir of Calisaya and Iron.—Each teaspoonful contains two grains of citrate of iron and five grains of calisaya bark.

Our Elixir of Calisaya, Iron and Strychnine.—Each teaspoonful contains five grains of calisaya, two grains of citrate of iron. and $\frac{1}{30}$ grain of strychnine.

Our Elixir of Calisaya and Tincture of Chloride of Iron.—Each teaspoonful contains five grains of calisaya bark and five minims of tincture of chloride of iron.

Our Elixir of Gentian.—This is about half the strength of compound tincture of gentian. Our elixir of gentian with tincture of chloride of iron is our elixir of gentian with the addition of five minims of tincture of chloride of iron to each teaspoonful.

Our Elixir of Calisaya and Pyrophosphate of Iron.—Five grains of calisaya and two grains of pyrophosphate of iron, in each teaspoonful.

Our Elixir of Pyrophosphate of Iron, Quinine and Strychnine.—Each teaspoonful contains two grains of pyrophosphate of iron, one-half grain of quinine, and $\frac{1}{64}$ of a grain of strychnine.

Here is one I would particularly call your attention to: our Elixir of Terpin Hydrate.—It is different from any other elixir of terpin hydrate on

the market. It contains full three grains of terpin hydrate in each teaspoonful, enough to get results.

All other Elixirs of Terpin Hydrate on the market contain only one grain to each teaspoonful, an amount entirely too small to be of much value. The minimum dose of terpin hydrate is three grains. Like all the rest of the elixirs, it is flavored with the oil of sweet orange.

Our Elixir of Terpin Hydrate and Codeine contains, in addition to three grains of the former, one-eighth grain of codeine in each teaspoonful.

Our Elixir of Terpin Hydrate and Heroin contains three grains of terpin hydrate and $\frac{1}{24}$ grain of heroin in each teaspoonful.

Our simple syrup is prepared by percolation, which avoids the use of heat, insures a thoroughly saturated solution and removes all coloring matter, rendering preparations made with it less liable to decompose, also adding to their appearance. A heavy syrup acts as a preservative agent, whereas a weak syrup will do just the opposite, often starting a fermentation. We use this syrup as a base for nearly all our syrups.

Our Syrup of Wild Cherry is of the same strength as the United States Pharmacopœia syrup and will mix with water without precipitation. There is nothing so disappointing to a physician as to receive a muddy mixture when he was expecting to receive a clear, bright preparation.

Syrup of Ipecac, when properly prepared according to the Pharmacopœia, is a permanent, clear and transparent syrup, and is not the muddy mixture made by simply adding the fluid extract to simple syrup, and frequently dispensed.

Syrup of Iodide of Iron.—This is of our own manufacture; it is a permanent preparation, unaffected by exposure to light or contact with air.

Syrup of Hydriodic Acid.—This is also of our own manufacture. It contains one per cent. of hydriodic acid. Each fluid ounce represents a little over six and a half grains of iodine, or is equivalent to a little over eight and a half grains of iodide of potassium. It has an agreeable acid taste and is useful where the patient cannot tolerate iodide of potassium.

Our 100 per cent. Solution of Phosphate of Soda.—Each teaspoonful represents sixty grains of sodium phosphate, United States Pharmacopœia. It is prepared without the addition of any foreign chemicals, such as sodium nitrate, usually employed by other manufacturers. It contains a slight excess of phosphoric acid. An agreeable effervescing phosphate of soda can readily be made from this solution by dissolving about fifteen grains of bicarbonate of soda in a half tumblerful of water and adding a teaspoonful of the solution.

Our Tasteless Castor Oil.—This is the best quality of castor oil, sweetened with saccharin and flavored with some essential oil.

Our Essence of Pepsin.—Very active and far superior to the usual run of wines and elixirs of pepsin found on the market. Each dessertspoonful represents three grains of pepsin, United States Pharmacopœia.

This is a sample of Muscatel wine we keep in stock. It has a fine flavor and is almost free from tannin.

Here is a sample of our Tincture of Digitalis. I brought this along to call your attention as to how it is manufactured. It is manufactured direct from the leaves. Here is a tincture made by diluting the fluid extract, quite a different preparation, and will not give the results obtained by using a tincture of digitalis prepared from the leaves. We make nearly all our tinctures from the drugs themselves, especially the important ones. Diluted fluid extracts are not tinctures. When the physician writes tincture, he does not want his patient to have a diluted fluid extract.

Here is another important preparation, Infusion of Digitalis. What I have said in regard to making tinctures from fluid extracts applies with a great deal more force to the making of infusions from fluid extracts, and in this instance particularly, infusion of digitalis, it is not only wrong but criminal to dispense such a preparation. Fluid extract of digitalis is prepared with alcohol, which extracts certain principles of digitalis which are harmful in most cases where the infusion of digitalis is especially valuable.

Here are samples of digitalis, belladonna and hyoscyamus, showing you exactly the quality of drugs we use in making these important tinctures.

Now as to the finished prescription, the prescription as it reaches the patient. All of our prescriptions are neatly wrapped with this red paper and tied with thin twine. We never use this paper for anything else, reserving it especially for prescriptions. For all liquid preparations we use a good long cork and cap each bottle. Capping is done entirely by hand. We use no ready-made caps.

The condition in which a patient receives a prescription makes all the difference in the world. External appearance often forms the patient's only means of judging a medicine. If it is badly wrapped, without much attempt at neatness, he is apt to think the medicine is not of much account, and nine times out of ten he is not much out of the way in coming to such a conclusion.

Konseals.—We carry all the different sizes and have a machine for closing them. They are not used very often; but occasionally they are useful, especially when you wish to give a bulky powder, such as trional or sulfonal.

For powder papers we use nothing but parchment paper, which we have cut in suitable sizes.

Here are a few filled capsules of sandalwood, copaiba, and Harlem oil, showing how completely we seal every capsule. Here is the one with Harlem oil. You know what a disagreeable odor there is about Harlem oil. If I had not told you these were Harlem oil you never would have suspected it, at least not by the odor. It is the same with the other capsules of sandalwood and copaiba. Whenever an oil is directed to be dispensed in capsules we are careful to seal every one of them. You will

not be bothered by the patient coming back to you and complaining about the taste or smell, or that they did not do him any good because the contents of half of them leaked out.

Here are other capsules which you cannot tell what they contain. They are not quinine, although they look very much like quinine capsules. They are asafetida capsules, and this is what we make them of: Very select tears of asafetida, entirely free from all impurities, no dirt and no sand. This is the kind we use in all our prescriptions and in all preparations of asafetida. Asafetida is one of the most valuable medicines we have in the whole materia medica, but the physician is very often disappointed in his results because his patient has been given a poor quality of asafetida. Here is the common asafetida—there is quite a difference; one costs about a dollar and sixty-five cents, the other only thirty-five or forty cents a pound. You cannot expect to get the same results from the one as you do from the other.

I do not know what the manufacturers use in preparing their ready-made pills. I do not believe they use the same quality of asafetida that we use in preparing prescriptions. These asafetida capsules are made by massing the asafetida with a little soap, and then rolling and dividing it on a pill tile. Each division is then rolled in flour, and with the aid of a pin they are put into capsules, the fingers never coming in contact with the asafetida. These precautions are taken so that the patient will never know he is taking asafetida. He will think he is taking quinine.

Tablet Triturates.—We are prepared to make them extemporaneously. Here are some that I have made. They are firm, but at the same time they can be readily crushed between the fingers. Sugar of milk is used as a base. Should you have any unusual formula you wish to prescribe in tablet form, or if you should want a fresh tablet, we are in a position to make them on short notice.

Here are a few pills. I have brought these along in order to show what we can do in the way of making pills.

The pills in this box are not sugar-coated pills; they are just the common, every-day, plain, two-grain quinine pills. You will notice that they are all alike, every one of them round as a shot and white as snow. That is just the kind of a pill we always dispense. You will never find in a batch of pills coming from our store some that are large and others small, neither will you find them to be of different shapes—some three-cornered and some four-cornered. Another point, if the ingredients entering into the composition of a pill are white, your patient is going to get a white pill.

Here are silver-coated and gold-coated pills. We can coat any pill for you with either gold or silver. We use nothing but pure gold leaf and pure silver leaf. We can also sugar coat them or chocolate-coat them, whichever you may direct on your prescription.

Here are some pills that we do not make. They are the commercial ready-made Blaud's pills. Here is one I have broken in two. I had to use a hammer to do it. Just take a good look at that pill. That pill has been actually painted black and varnished in order to make it look nice. You would not expect to get any results from a pill like that, would you?

If you want to be sure of good results when you wish to give Blaud's pills, always order them freshly made. These are some of our own make of Blaud's pills. We never keep them on hand ready-made, as they are only fit to use a short time after making them.

Suppositories.—We make them on short notice, and of any composition you may wish. In making them, we use nothing but pure cocoa butter. They are uniform throughout. You will not find among suppositories that we have made, one light-colored one and one dark one, or one marbleized and another speckled. Here is one that I have cut in two, in order to show how well they are made.

We are also prepared to make bougies, either of gelatin or cocoa butter, and any formula you wish to use. It sometimes happens that a physician has a case requiring something of this kind, but hesitates to prescribe them, because he does not know just where to send his patient to have them put up.

Citrate of Magnesia. — We never keep any made up. We always prepare it fresh. We also use the new patent stoppered bottles. Likewise we never keep any spirit of mindererus nor solution of potassium citrate made up.

Now as to chemicals: We keep a separate set of pure chemicals, especially for use in prescriptions. The kind of chemicals we sell over the counter for mechanical purposes, and for use in the arts, we would never think of using in a prescription. We think that in medicine, where the health and happiness of a patient are at stake, the best is none too good.

Take, for instance, Ammonium Chloride, chemically pure. This is the kind we use in our prescriptions. Notice how nice and white it is, and free from odor. Here is a sample of the commercial article; notice the color and odor. It smells like common muriatic acid.

Sodium Bicarbonate, pure, is free from dust and dirt, and tastes quite different from the common baking soda.

Tannic Acid.—Pure and completely soluble in water, making a clear solution. Here is the common tannic acid, not entirely soluble, and making a dark solution.

It is the same with Sodium Salicylate. Here we have the refined sodium salicylate, pure, white, forming with water a colorless solution, without the necessity of filtering. It is odorless, and of a pure, sweet taste.

Here is some of the common Salicylate of Soda. It is pink instead of white; its solution in water is not clear, and its odor and taste are quite disagreeable.

This is a sample of pure granulated Sodium Phosphate.

This is the kind of Oil of Eucalyptus we use. Notice whose make it is.

Beechwood Creosote.—We use the best that can be had. See on the label what the manufacturer has to say.

This is granulated Gum Arabic. We use this in making emulsions. A word about Mucilage of Gum Arabic. We never have a drop of it in the house. Whenever mucilage is called for on a prescription, we always prepare it extemporaneously, using this granulated gum arabic and distilled water. I do not know of anything that will spoil as quickly as mucilage of gum arabic.

Here is some imported Syrup of Lactucarium. This preparation is very popular with some physicians in eastern cities. We also have the lozenges of lactucarium.

This is a special brand of pure castile soap we carry. It is a pure and neutral soap made of olive oil and soda.

Pure Benzoated Lard.—We use this in all ointments whenever lard is directed to be used.

Here is a very important ointment and one that if not carefully made will do harm instead of good. It is the Oxide of Zinc Ointment. In preparing this ointment, we use what is known as Hubbuck's Oxide of Zinc, the only kind that ought to be used. Notice how smooth and white this ointment is. An ointment made from the commercial oxide of zinc will always be gritty. It can never be made smooth, and instead of having a soothing and healing effect, it will do just the opposite, irritate instead of heal.

The same care and quality of materials that we use in preparing our zinc ointment is also used is preparing all ointments dispensed by us.

The finish you will notice on this jar of ointment is an example of the kind of a finish we put on all ointments we dispense. It adds fifty per cent. to the appearance of an ointment, is quickly done and costs nothing.

This is about all I have to show at present. Doctor, I thank you very much for your kind attention and for allowing me to take up your time in this manner. I wish you would kindly bear us in mind when prescribing, and say a good word for us whenever you can. Any work that you can send us will be thoroughly appreciated by us and skillfully and promptly executed.

I wish to say a word about these various specialties on the market, such as listerine, borolyptol and celerina. Nearly every physician occasionally prescribes one or another of these preparations. These of course we do not make ourselves, and whenever we receive a prescription calling for any of these various specialties, we dispense them from the original bottles, as is done by all respectable pharmacists. It is true, we can make something to look, smell and taste like some favorite specialty, but whether it will give the same results is questionable. Results is what the physician is aiming at, and it is our business to help the physician get good results."

Now it must not be supposed that when we called on a physician all these samples were shown and this long talk given on our first visit. Such was not the case. We made several calls and expect to continue calling on physicians and working along this line; our prescription department furnishing us with an almost inexhaustible supply of material.

The result of our work was satisfactory in every way, affecting not only our prescription department, but trade in general; a most noticeable feature being a decided improvement in the quality of our patronage, more than justifying us in continuing our efforts in this direction.

The following are the formulas, samples of which were shown to the physicians:

Simple Elixir.—Best oil of sweet orange, 2½ fluid drachms; alcohol, sixteen fluid ounces; syrup, 24 fluid ounces; water, 24 fluid ounces; washed talcum, 1 ounce. Dissolve the oil of orange in the alcohol and mix with the washed talcum; then add the syrup and then the water; mix and filter. Return the first portion of the filtrate until it runs through clear. The best oil of orange must be used. To preserve oil of sweet orange in good condition, mix it with an equal volume of alcohol as soon as a fresh bottle is opened, and keep in a cool, dark place.

Washed talcum is superior to anything we have tried as a filtering agent for elixirs. In preparing it we make use of the process of elutriation, excepting that the coarser particles are to be reserved and the finer particles allowed to escape. When ordinary powdered talcum is used as a filtering agent, it is these finer particles which retard filtration and cause trouble, sometimes neither sinking nor rising. When washed talcum is used filtration proceeds rapidly and the elixir remains clear. Gray filter paper works better with washed talcum than the white. If an elixir does not come through clear at the start, return the first portions to the filter until it comes through clear.

Red Elixir.—Simple elixir, one pint; solution of cochineal, one fluid drachm. Mix and filter.

Elixir of Calisaya.—Sulphate of quinine, 36 grains; sulphate of cinchonine, 12 grains; sulphate of quinidine, 10 grains; sulphate of cinchonidine, 6 grains; simple elixir, 4 pints; caramel, sufficient to color the elixir a very light brown. Triturate the mixed sulphates with ½ pint of the elixir, pour the elixir into a glass flask, and heat in a water-bath until the solution is effected; while still hot add the remainder of the elixir and the caramel; when cold filter. (W. S. Thompson.)

Elixirs of ammonium, potassium and sodium bromides are prepared by dissolving the required quantity of the respective salts in red elixir and filtering the solutions.

Elixir of Ammonium Valerianate.—Valerianate of ammonium, 260 grains; water, one fluid ounce; water of ammonia, q. s.; red elixir to make 16 fluid ounces. Mix the salt with the water and add, gradually,

water of ammonia until a solution neutral to test-paper is obtained. Mix this solution with the red elixir and filter.

Elixir of Calisaya and Iron.—Citrate of iron and ammonium, 256 grains; elixir of calisaya without the caramel, to make 16 fluid ounces; mix and filter.

Elixir of Calisaya, Iron and Strychnine.—Make a solution of strychnine in alcohol so that each minim will represent $\frac{1}{100}$ grain; take 256 minims of this solution, and add enough elixir of calisaya and iron to make 16 fluid ounces; mix and filter.

Elixir of Calisaya and Phosphate of Iron.—Soften 256 grains of phosphate of iron in ½ fluid ounce of warm water and add 15½ fluid ounces of elixir of calisaya; mix and filter.

Elixir of Gentian.—Fluid extract of gentian, 1½ fluid ounces; simple elixir 14½ fluid ounces; mix and filter.

Elixir of Gentian and Tincture of Chloride of Iron.—Fluid extract of gentian, detannated, 1½ fluid ounces; tasteless tincture of chloride of iron, 640 minims; simple elixir enough to make 16 fluid ounces. Add the fluid extract and the tincture to enough simple elixir to make 16 fluid ounces; mix and filter.

Elixir of Pyrophosphate of Iron, Quinine and Strychnine.—Sulphate of quinine, 60 grains; strychnine, one grain; citric acid, 5 grains; stronger alcohol, 3 fluid ounces; solution of oil of orange, 50 minims; syrup, 6 fluid ounces; pyrophosphate of iron, 256 grains; distilled water, 7 fluid ounces; water of ammonia, q. s. Triturate the sulphate of quinine, strychnine and citric acid together until minutely divided; then add the alcohol and solution of orange. Warm the syrup slightly and add to the turbid mixture, when, upon stirring, the mixture becomes clear. To this add the pyrophosphate of iron, previously dissolved in the distilled water, and finally, carefully, water of ammonia (drop by drop) until the mixture is perfectly neutral to test paper; filter. The solution of oil of orange is made by dissolving (1) fluid drachm of oil in 9 fluid drachms of alcohol.

On pages 537, 538 and 539, United States Dispensatory, fifteenth edition, will be found quite a list of formulæ for elixirs which deserve a very much wider publicity. The formulas just given were taken from this list, only a few alterations being made. There is no reason why pharmacists should not prepare all of their elixirs. As a flavoring agent for elixirs there is nothing that can equal fresh oil of sweet orange. All elixirs are greatly improved in appearance by filtering through washed talcum.

Simple syrup is prepared by percolation. All syrups are greatly improved in appearance by allowing them to pass through absorbent cotton.

Syrup of Wild Cherry.—Fluid extract of wild cherry (Procter's formula), 5½ fluid ounces; simple syrup, to make 16 fluid ounces; mix them.

Syrup of Ipecac.—The U. S. P. formula leaves nothing to be desired.

Syrup of Iodide of Iron.—The U. S. P. formula is satisfactory. To prevent change, a small quantity (½ per cent.) of citric acid is added.

Syrup of Hydriodic Acid.—The most satisfactory formula is the one by F. W. Haussmann, found on page 462 of the Proceedings of 1899. Shaking with a little purified animal charcoal and filtering adds very much to the appearance of the syrup. This syrup keeps perfectly if exposed to light; but if kept in a dark place it gradually turns dark. Subsequent exposure to light does not restore it, and shaking with purified animal charcoal and filtering, while removing very much of the color, does not entirely restore it.

A curious thing was noticed in connection with this syrup. After shaking the freshly-prepared syrup with purified animal charcoal and filtering, nearly a third of the syrup was of a light gold-yellow color and had settled to the bottom. Returning it to the filter did not improve matters; the same color was noticed. I thought the syrup was ruined, when the most curious of all happened. On shaking the syrup once or twice it instantly became as bright and as clear as distilled water.

One Hundred Per Cent. Solution of Phosphate of Soda (J. W. England, Drug. Circ., July, 1890, p. 166).—Sodium phosphate (anhydrous), 1,536 grains; phosphoric acid, 85 per cent., 542 grains; water to make eight fluid ounces. Dissolve the phosphate of soda in the mixture of acid and water; filter through absorbent cotton.

Tasteless Castor Oil.—Saccharin, 4 grains; alcohol, sufficient to dissolve; castor oil, 16 fluid ounces; oil of wintergreen, 20 minims; oil of cinnamon, 5 minims. Dissolve the saccharin in alcohol and add to the other oils; mix.

Essence of Pepsin.—Pepsin, in scales, 192 grains; water, 4 fluid ounces; alcohol, 1 fluid ounce; syrup, 1 fluid ounce; Muscatel wine, enough to make 16 fluid ounces. Dissolve the pepsin in the water, add the syrup and alcohol, and enough fine Muscatel wine to make 16 fluid ounces; mix and filter.

Dispensing oils in ordinary capsules.—After removing the caps place the capsules in an upright position in a holder prepared for the purpose. Drop the required quantity of oil in each capsule with a dropper, and seal the cap on each capsule. The holder is made by punching the required number of holes of the proper size in a cardboard box or lid, with a pointed lead pencil. For sealing, use a warm solution of gelatin and apply to the inner edge of the cap with a pointed stick.

Tablet triturates are prepared in the same manner with sugar of milk, using the ordinary tablet mould.

White Quinine Pills.—All that is necessary is to have clean fingers, a clean mortar, and clean everything else; use flour as a dusting powder.

Blaud's Pills.—The United States Pharmacopœia formula is quite satisfactory.

Bougies of Cocoa Butter.—The mass for forming bougies is prepared by working the cocoa butter in a mortar, using a little castor oil just as you

would use syrup in preparing a pill mass. For forming the bougies we use a home-made machine which consists of a half-ounce hard rubber syringe fitted with a wooden plunger; the point of the syringe being cut off close, and the hole made of the proper diameter by burning with a red-hot wire nail. The mass when ready is put into the cylinder of the syringe, and forced out with the plunger. The pipe, as it issues from the cylinder, is allowed to roll on a smooth piece of paper and then cut into proper lengths. The points are made by holding the finger to one end of the bougie, and moving the bougie horizontally across the paper backward and forward. The syringe idea was taken from Merck's Report, I cannot recall just how far back.

Gelatin Bougies.—Instead of using glass tubes for moulding, we use paper tubes, made by wrapping some paper around a glass rod of suitable diameter, and pasting the edge. The glass rod is then withdrawn, and the tube is ready for use. The tube is filled with gelatin solution by applying suction, and when full both ends are sharply bent to prevent it from leaking out. After the tubes are filled, they are placed in ice-water for half or three quarters of an hour. The paper can then be easily unwrapped from the bougie. The points are made by trimming with a pair of scissors. The tubes must be well oiled before filling with gelatin solution.

Mr. Kaemmerer was heartily applauded.

THE CHAIRMAN: I suggest that the part of the paper containing formulas be referred to Mr. Diehl, to be used in connection with the National Formulary work. The fact that so young a man has done this work, comes here and takes an interest in this Section, is a very favorable sign.

MR. ARDERY: I would like to ask Mr. Kaemmerer how he regards the cost of these preparations, as compared with those ot the large manufacturing companies?

MR. KAEMMERER: It is greatly in our favor. But we do not figure in our time at all.

MR. ELIEL: Has the gentleman any objection to stating his processes?

MR. KAEMMERER They are in the paper submitted.

MR. LOWE: This gum-arabic passed around looks as if it had been crushed fine and sifted. In the East it is powdered and granulated afterwards, looking materially different from this.

MR. EBERT: I feel that the thanks of the Association are due to the gentleman for his efficient work. It is the first time our attention has been called to the importance of doing what the manufacturers have been doing—the people who have been going around taking away our bread. [Applause.]

MR. KAEMMERER: The granulated gum-arabic to which Mr. Lowe has referred was bought from the jobbers; that is what they supplied us. It worked satisfactorily.

MR. MITTELBACH: What general excipient was used in making your pill masses, Mr. Kaemmerer?

MR. KAEMMERER: As a general thing, I used glycerite of tragacanth.

MR. STEDEM: Mr. Kaemmerer in submitting his samples of digitalis leaves to the physician for inspection, called his particular attention to the fact that the leaves cost $1.25 a pound, as against 25 or 30 cents for the common leaves on the market; and it may be added that he gets 30 cents an ounce for the tincture, as against five cents for the other kind.

MR. DEWOODY: Mr. Kaemmerer says that his digitalis costs him $1.25 a pound, and he does not count the time.

MR. STEDEM: But he gets 25 or 30 cents an ounce for the prescription.

MR. DEWOODY: That is all right, but our time is worth something as well as the increased cost upon the superior quality of digitalis.

MR. LOWE: It is a question whether these leaves costing $1.25 a pound—which, I suppose, are cultivated in England—contain as much digitalin as the German leaves, costing 25 cents a pound.

MR. SAYRE: I think the chief value of this paper lies in the fact that it shows that the retail druggist is discovering how to bring himself in contact with the physician. I think the paper is to be highly commended. Heretofore the retail druggist has been sitting within his four walls from early morn till late at night, and has not gone out after business. He has expected his patronage to come to him. Some years ago, when I was in business, I received a pound of beautiful crystals of carbolic acid. I thought, perhaps, it might be wise for me to put them up in small bottles and send them to the physicians. I did so and it was surprising what attention the physicians gave to the particular sample. Although located in Philadelphia, a party came in one day from Frankford, which is some five or six miles away, with a prescription from a physician, and said he wanted that particular carbolic acid I had sent out. It shows how important it is for the retail druggist to go to the physician, or bring himself in contact with the physician.

MR. SCOVILLE: Up in Massachusetts one of our graduates bought a store some three years ago. At the time he bought the business the store was in a bad way. It had been sold two or three times. The first proprietor was obliged to take it back on a mortgage, because the purchaser had not made a success. So he got to that point where he would take nothing but cash. He had made money there himself, but the business was gone. This young man got a little backing and started in a very small way; he got in with the physicians and the first year his profits were $3200; the second year they were more, and he will make even more the third year.

MR. ELIEL: I never solicit business from the physicians directly, in any way, shape or form. The only way I ever approach them is by attending their meetings, and occasionally demonstrating something for them—for instance, a method for assaying certain drugs. In that way they see that I take an interest in pharmacy, and the impression is made that I am capable of putting up a prescription in a way to accomplish the result they are anxious to obtain with their patients.

Now a few words about infusion of digitalis. There are quite a number of our physicians who write prescriptions and use this preparation quite frequently, and while I get very few prescriptions from some of them, ordinarily, yet almost invariably, when they ask for infusion of digitalis the prescription comes to me. The reason is, I use selected leaves. Every leaf is selected in the first place and then I go over them very carefully again. I take nothing but perfect leaves, without a spot or any appearance of an imperfection on them. This care has resulted in my getting ninety per cent. of the prescriptions for preparations of that kind in our city.

MR. ANDERSON: Our attention has been called to the advantage to the retail druggist in thus approaching the physician and gaining his confidence. Now the American Pharmaceutical Association and all other organizations work on the broad idea of benefiting all, and I believe that this paper suggests to us the fact that this mode of procedure can be used to benefit all druggists. We know that physicians do have their minds drawn away from pharmacopœial preparations and from National Formulary preparations, and, if we had concerted action on the part of the retail trade by their organizations, in different localities, engaging good men, giving them samples of the National Formulary preparations, and having them visit the physicians, and showing to them the quality of our preparations, I believe it would have the effect of drawing us closer to the physician and would benefit the retail druggist accordingly. [Applause.]

MR. HALLBERG: About ten years ago I had some experience in endeavoring to get the retail druggists to advertise to the public. They did not seem to appreciate it at that time, but during these ten years there has been a most wonderful development of the desire of the retail druggist to advertise with the public. At the White Mountain meeting in 1892 I proposed a scheme to be used with the medical profession, but nothing was done. Now, if there is any need for advertising to the public, there is at least one hundred times—yes, six hundred times—more need to advertise to the medical profession, because there is one physician to every six hundred of the population in the United States. [Laughter.] When you advertise to the public you may be advertising to one man out of a hundred interested in medicine, but when you advertise to the medical profession you are bound to strike every time a man interested in medicine. You concentrate your fire. You cannot miss. If there is one reason for advertising with the public, there are nine hundred and ninety-nine thousand reasons why you should advertise to the profession.

MR. LEMBERGER: We are getting away from the subject a little, I think. The gentleman has presented a very valuable paper, going to the commercial side of the business. I want to make one suggestion on the same general line in justifying the gentleman in his use of the plan he has adopted. The physician may not always give you the time you would like to have, to enlighten him on your entire ability to supply his wants, in the most practical and beneficial manner. We do not lose sight of the fact, however, that most of the physicians are ready to receive the detail men from all the large pharmaceutical establishments. They receive them from a right spirit, or, perhaps, from a mercenary standpoint, but they receive them. In the little town I come from, we have met with cases of persons coming in with a two- or a four-ounce vial, saying, "We got this from our doctor at his last visit and we wonder if we could get it now, without going to the doctor for it." Now, if this detail work helps the large manufacturing firms of the country, it ought to help the individual pharmacist in his own locality. We are told that the gentleman did not leave his samples with the physician, but simply brought to his attention the fact that he could do as well by him as by any other firm, large or small, in the country. I want to emphasize the fact of detail work among the doctors, particularly in the larger cities. In the big cities, where the doctors do not know you and you do not know all the doctors in person, I think the plan pursued by our friend from Columbus ought to be exceedingly satisfactory, though it would hardly work so well in the country districts and smaller towns.

MR. HURTY: I think the gentleman has pointed out to us most happily how we can practice pharmacy. It is true pharmacy that he proposes, and I would contrast it with some of the other recommendations we have listened to. When we talk about increasing our soda-water trade we are not talking pharmacy, nor the science of pharmacy, nor the real progress of our art or profession. Neither are we progressing in pharmacy when

we get together and organize and endeavor to manage the sale of patent medicines. That is not pharmacy, as I see it. It is all very well, perhaps, and I am not opposing it, but I am just making the point that it is not pharmacy. After all, it is just as possible, and just as easy, for the customer to purchase his soda-water from the confectioner as from the pharmacist. But he can't purchase these beautiful, perfect quinine pills from the confectioner. He cannot get them of anybody but the pharmacist. He must go to an earnest man, to a serious man, to a scientific man, for such elegant articles as that. Nor can he get such beautiful magnesium preparations from the confectioner. Neither can the man who gives his attention to patent medicines make such excellent preparations. It is the science of pharmacy that makes us different from other people. "It is righteousness that exalts a nation," not business; neither is it the lawyer, or the soldier, or even the minister, from the mere fact of his calling—but righteousness. So it is science that exalts our profession. And that is the great point of this paper. If it does not make you a cent of money, it will make you self-respect. We must have the money, of course, but the science of the profession brings something more valuable than money—that is, progress and helpfulness to the race. I, for one, welcome most heartily papers of this sort. [Applause.]

The chair announced that, without further discussion, the paper would be referred to take the usual course, with the thanks of the Section to the author.

THE CHAIRMAN: At this moment, when we are feeling a little encouraged, I want to read a short correspondence and then call upon our noble patron for a few words, because I think he must already see the fruits of his efforts.

The Chair then read the following letter from Dr. Enno Sander:

ST. LOUIS, MO., *August 7, 1900.*

MR. HENRY P. HYNSON, *Baltimore, Md.,*

My Dear Sir: Although not connected any longer, practically, with the noble profession of Pharmacy, I still maintain a lively interest for its advancement and have particularly noticed with much satisfaction the inauguration and progress of the important work heretofore of the Committee and now of the "Section on Practical Pharmacy and Dispensing," and believe it should have all the encouragement possible. If in regard to this you should conceive it would promote your purposes and stimulate your members to greater activity, I gladly offer this Section the sum of fifty dollars, annually, to be distributed as a prize upon such conditions as the members of your Section may deem most advisable.

The offer is made, of course, subject to its acceptance by the Council of the American Pharmaceutical Association.

With kind regards and best wishes for the success of your Section, I am,

Yours faithfully, ENNO SANDER.

Great applause greeted the reading of the letter.

Mr. Hynson then read the following reply to Dr. Sander's letter, and stated that he had received a letter from the Secretary of the Council announcing the acceptance by that body of the generous offer made:

BALTIMORE, *August 15, 1900.*

DR. ENNO SANDER, *Ex-President American Pharmaceutical Association, St. Louis, Mo.*

My Dear Sir: I have your very kind favor of the 7th inst., offering the sum of fifty

dollars annually to be distributed as a prize or prizes for work to be done in the Section on Practical Pharmacy and Dispensing.

I appreciate your generous interest very much and will at once submit the offer to the Council, which I have no doubt will readily accept it and acknowledge the great help it will be to this Section, now a part of the Association.

I can as yet only tender my personal thanks, which you will please accept, while I most sincerely wish that your noble life may be still further lengthened many years, that you may witness the ripened fruit which will surely follow this wise seed-planting of yours.

Sincerely, H. P. HYNSON, *Chairman.*

THE CHAIRMAN: Now, if Dr. Sander will oblige us, we will be glad to have him say a word of encouragement to these younger pharmacists.

The doctor was applauded as he arose to speak.

Ladies and Gentlemen: I see two ladies in here—but one in particular [applause]—and I will tell you why in particular: because I think she has shown you by her success what a lady-pharmacist can do. She commenced the retail drug business in Minneapolis, I suppose about six years ago, with but scanty means, and now she is in such a flourishing condition that she can travel all over the country and visit our meetings. She has been one of our Vice-Presidents. She has always shown great interest in the Association. I have seen her store in Minneapolis, and she is prosperous, she is moving. She has two clerks now and an errand boy, and the doctors all like to send their prescriptions to her. [Applause.] I want to say that I admire her for her personal attractions and her business qualifications, and I hope all these young pharmacists may do as well as Miss Josie Wanous has done. [Applause.]

In regard to the other matter, I am sorry I cannot do more for the young druggists who want to rise. If dear brother Hynson had not told me that he would be glad to have it I would never have thought of it.

I am very much obliged to you for your kind attention. I hope I may meet you when I am eighty—I won't say how many years that will be. [Great applause.]

The Chair proposed a rising vote of thanks for the generosity of Dr. Sander, and it was heartily and unanimously carried.

THE CHAIRMAN: Dr. Sander, I hope you will accept this action as evidence of the appreciation of the Section.

Having heard a paper from one of the younger members of the Association, I offer here something from one of our older members—Mr. DuPuy, of Detroit.* This paper is submitted by the oldest member of the Association, to show his interest in our work. Congratulations have already been sent to Mr. DuPuy upon the attainment of his 84th birthday. I would like to entertain a motion that this contribution be published, with proper explanation, in the Proceedings.

Mr. Mayo made the motion, and it was adopted without dissent.

* Mr. DuPuy died three weeks after the close of the St. Louis meeting.—The General Secretary.

FORMULA FOR A DEXTRINATED COMPOUND, USEFUL IN BRONCHIAL AFFECTIONS.

BY EUGENE DUPUY.

Wheat-flour, Licorice Root, bruised, Evaporated Prunes, bruised (kernels included), of each	500 grams.
Ground Malt	250 grams.
Cubebs, bruised	60 grams.
Linseed, bruised	60 grams.
Ammonium Chloride	30 grams.
Extract of Hyoscyamus	15 grams.
Bloodroot, bruised	15 grams.

Put the licorice root in 3 pints of cold water for 36 hours, stir occasionally, strain, heat the strained liquid in a covered vessel, and infuse the other ingredients in it, except the flour and the malt. Strain, heat again to boiling point. Cool down to about 90° F. and stir in the flour. Stir in the ground malt, and keep up that temperature down to 80° for 2 or 3 hours, then strain again. Evaporate the liquid part till the residue can be handled without sticking to the fingers. Cover it with starch, and make up into lozenges by means of a cutter.

The Chair called on Mr. Hassebrock to read a paper on elixir of potassium bromide, which he did as follows:

ELIXIR POTASSII BROMIDI, N. F.

BY H. F. HASSEBROCK.

The present formula is not popular. The change made in the last edition of the National Formulary directs the use of aromatic elixir, thereby making it a white or colorless elixir, in place of elixir adjuvans in the 1888 formula, which makes a dark colored elixir, more palatable and pleasant to take, nearer in color to what the physician and patient had been in the habit of getting.

I have had some unpleasant experience at the time the new Formulary came out; as I believe in following or complying with the rule of making my preparations after a standard and recognized formulary. A physician prescribed four ounces of elixir kali brom., on which I dispensed the new white elixir, and marking my prescription in case of a refill, that the same would be given; an hour after the bottle was returned, with the statement that the doctor said it was not right, it should be a dark red mixture; which necessitated my calling on the doctor, explaining everything to him, and in turn have him explain to the patient the change made in the formula, after which the doctor informed me he would prefer the elixir made after the 1888 formula.

In making inquiries around the city, I did not find one who dispensed the white elixir according to our present formula, and less than twenty per cent. who made it with elixir adjuvans; the general rule seems to be the

easy way, that of coloring the elixir with carmine or cudbear solutions, making all shades from a pale pink to a deep red color. This would be alleviated by adhering to the one good, old, reliable formula of 1888; this makes an elegant preparation of uniform color.

I, therefore, recommend that the National Formulary Committee be requested to reinstate the formula of 1888.

On motion of Mr. Hallberg, the paper was referred to the National Formulary Committee.

After a somewhat protracted discussion of the subject of frequent changes in the color and flavor of several preparations of the National Formulary, which was participated in by Messrs. Ebert, Hereth, Hemm, Dewoody, Hallberg, Stevens, Diehl and Searby, Mr. Mayo offered the following resolution, which on motion was adopted:

Resolved, by the Practical Pharmacy and Dispensing Section, that unless more important advantages will occur therefrom, it is recommended that no change in either color or flavor be made in any preparation of the National Formulary.

MR. DIEHL: I think you should be careful, gentlemen, how you handicap the work of the Committee on National Formulary. It has a great deal of work to do and assumes a great responsibility. You should make the work as light as possible. Do not forbid them to use a certain coloring matter or a certain flavor. Leave that to the committee. You can afford to do so.

THE CHAIRMAN: We have here a suggestion from Mr. Sennewald in regard to keeping records of prescriptions that I would like him to explain to the Section. It is very desirable to have some means of procuring the number of a prescription when it has become obliterated from the label or when the labeled container is not at hand.

E. A. Sennewald, of St. Louis, then exhibited the following plan for a prescription record, explaining that "P" meant paid, "N P" not paid, and "C" charged:

Number.	Price.	Paid.	Not Paid.	Name.
137421	50	P		
137422	60	....	N P	John Doe.
137423	30	....	N P	John Doe.
137424	10	....	N P	Hy Brown.
6810	90	P	....	Hy Smith.
36459	30	....	N P	Hy Smith.
137425	20	C	N P	Mrs. Wilson.
137426	60	C	N P	
137427	40			
127429	20			
137430	60	P		
137431	90	P		

Mr. Sennewald passed a specimen of his record sheet among the mem-

bers. While he was doing so the Chairman called on Mr. Stedem to read a paper he had prepared, and to describe the exhibits. Mr. Stedem then read the following, illustrating his remarks by exhibiting and describing numerous samples of package goods, devices and appliances that he had on the table before him—things that he considered legitimately within the purview of the business of the pharmacist, and that would yield him a good profit if proper attention were given to them :

THE EXTERNALS OF PHARMACY.

BY F. W. E. STEDEM.

In offering this paper for your consideration, it is my intention to remind you at once of the assertion I have frequently made that we have always given entirely too much prominence in our business relations and affairs to the topic of patent medicines and their sale. We consume many valuable hours discussing methods for restoring the prices of articles which we all have to condemn when we for a moment consider the ethics of our business or profession. We should take the stand firmly and determinedly that patent medicines are, on the whole, a nuisance and are tolerated by us simply as a matter of convenience for our patrons ; that we carry them for pretty much the same reason as we supply the public with postage stamps and other commodities out of which we get no direct profit. I can see no good reason why we should continue to constantly wrangle and trouble ourselves over this question of patent medicines and the restoration of prices on them.

It would be very much better for us all if there were no patent medicines, and we simply present the spectacle of making it appear that they are an absolute necessity to us and that we need their presence as an excuse for our being in business. It seems to me that if the pharmacist, after spending four years of preparation as an apprentice, many hours of which are spent at school in the pursuit of exacting and brain-racking studies, can find nothing better to which to apply all this knowledge than the handling of patent medicines, that pharmacy has come to a sorry pass indeed. I am unwilling to believe, and do not think that any one has good cause to think that there is nothing else in pharmacy. A very little bit of calculation will convince you that it is possible to open up a fairly well stocked drug store for less money than it is possible for a first-class mechanic to open up a horse-shoeing establishment ; and if our prospective pharmacist has at his fingers' ends, as he should have, such knowledge of the manipulation and manufacturing of crude materials into salable preparations, and avails himself of proper and legitimate methods of advertising, there is no reasonable cause why he should not speedily develop a business which he can truly call his own and out of which he can make a percentage profit equal to all his necessities and in time acquire not only capital, but be able to put by earnings in sufficient quantity to insure a tranquil old age.

Your attention is directed to the display of spices and many toilet preparations offered for your inspection by the Chairman of the Committee on Practical Pharmacy and Dispensing.

I believe it to be very unwise on our part, in factoring and exposing for sale preparations of our own make, to devote too much time to those things which seem to be an imitation of the patent medicines. I would not deny any one the privilege of making and selling all such cough medicines or stomach bitters or any other household remedy that he may have a demand for in his particular locality as he possibly can; but I would recommend strongly all such sales be made as quietly, and with as little ostentation as possible, and this for the purpose of not antagonizing the physician in his neighborhood, feeling that he has very much to gain by keeping all the physicians as his friends, and at all times to avoid as much as possible either the appearance or the intention of trespassing in the physician's province. On the other hand, the requirements of every-day active business life afford a very great variety of demands, many of the articles of which he can manufacture himself, and not in the least antagonize his physician friends. I refer particularly to a line of toilet requisites, and those things of household necessity which appeal to the vanity of the people. You might sell ten thousand bottles of hair tonic without any of your physician friends for a moment intimating that you were interfering with their rights, or that you were counter-prescribing. This same thing can be said of hair dyes and freckle lotions, remedies for corns, pimples, and all other materials of a similar nature.

In the country places it is considered entirely legitimate on the part of the pharmacist to develop a trade in agricultural supplies, fertilizers, veterinary medicines and substances suitable for sale to persons who raise chickens and other fowl for market purposes. A line of remedies for the treatment of dogs, cattle and chickens can be made to yield a very large profit, and at the same time increase the reputation of the druggist in the entire neighborhood. These things yield a handsome profit, are easily made, and the manufacture of them can be so arranged as to occupy time during the dull season. Trusses, crutches, abdominal bandages, elastic stockings and electric belts offer exceptional opportunities of profit making. Cut out your cigar and candy stand and add trusses. The sale of one truss a week will net a greater profit than the sale of one hundred pounds of candy, or two thousand five-cent cigars.

A word as to the style of prescription packages. People usually judge such work through the part of it that they understand, namely the appearance of the bottle, label and wrapper. Give the subject the care it merits, and reap the reward in increased business and added profits.

Mr. Stedem also called attention to a lot of bottle goods and packages exhibited by Hynson, Westcott & Co., of Baltimore; S. A. D. Sheppard & Co., of Boston, and George Evans, the Philadelphia "cutter;"

also to a display of the specialties of Mr. W. C. Alpers, of New York; all of which he explained at some length. He also directed attention to a display of labels, cartons, etc., and exhibited the working of an apparatus Mr. Kaemmerer has referred to in his paper as a device they had made and used with success in making cocoa-butter and gelatine bougies. Also a scheme submitted by the American Synthetic Company, of Philadelphia, for making certain pathological work practicable in the drug-store. Mr. Hynson also exhibited and explained some of the specialties of his establishment.

The Chair called for remarks upon Mr. Stedem's paper and his exhibits.

MR. MITTELBACH: These exhibits and ideas are very attractive. But the trouble is, that the small druggist cannot buy these cartons, for instance, and these pretty packages in small enough quantities. The majority of druggists are not able to buy the quantities offered by the manufacturers. If they could be bought in small quantities, at reasonable prices, it would help us a great deal.

MR. STEDEM: In this exhibit of labels and boxes the prices will be found on the back of each label and box, and the prices seem reasonable.

MR. SLOAN: These cartons could be bought plain at a reasonable price, and the labels attached afterwards as needed.

MR. PETTIT: It is not so much the actual cost of the cartons, but the impression that is made upon the country customer by their use. You can use them in the city trade, but when you attempt to put goods up in that way in the small towns, and tie them up with ribbons and all that sort of thing, the country cousin thinks he is paying for the fun, and he would rather buy his Epsom salt by the pound. So in my store I wrap up the country orders in paper.

MR. STEDEM: My first experience was gained in the agricultural districts of Ohio, and I have a recollection of hunting up tin cans as containers for the farmers. They appreciated the value of good containers to keep out the dust.

MR. SHEPPARD: I had a customer once who said she liked to buy from us because we wrapped things up in *two* papers.

MR. ELIEL: In regard to the cost of packages: The pharmacist in the small towns who cannot afford to have distinct packages for each article might follow the plan I have adopted. I have cartons, for instance, for a one-ounce vial—two, four, eight and sixteen-ounce vials. I get them blank, and in such quantities as I can use up in a reasonable time. Then I have labels for the different articles, which are gotten up for each particular thing, in different sizes, according to the article. Then I have adopted a uniform style of bottle, which exactly fits into the carton. It adds but little to the expense of the article and it has met with great favor in the trade. I have to a large extent adopted the same method in doing up packages for ordinary sale—such as sulphur, Epsom salt, borax and the like; and I find it has increased the sale of these articles. My experience with the strictly country trade is very much that of Mr. Pettit. They are very apprehensive of paying for such packages, and they prefer to have them done up in paper—brown paper, if possible. [Laughter.]

MR. EBERT: All my life, since I have been in the drug business, I have prided myself on putting up a nice, neat package, neatly labeled and tied. I have continued that from

the day I went into the business up to the present time. But about two weeks ago I got a set-back that I shall not soon forget. I was told in plain language that I was a back number. [Laughter.] A gentleman came into my store and asked for five cents' worth of Epsom salt. I waited on him and handed him out a nice package, properly tied and labeled. He said, "I want that in a box: haven't you got it in a box?" "No, sir; we sell our goods in this way," I said. "Well," he said, "I guess you are not up to the times. When I buy Epsom salt I always get it in a box, for then I can take out what I want and have it in good shape for next time. I prefer not to buy from you, sir." And he walked out. I said to the clerks, "I guess we will have to change things in this store somehow. I guess I am a back number after all." [Laughter and applause.]

MRS. HALL: The people down in "Egypt" are twenty years behind the times, you know, but I believe the people there, town and country, are glad to have things done up as neatly as possible. Sometimes a person will come in in a hurry and will not wait to have it done that way, but as a general thing they prefer it. In many cases we make up the packages in our leisure moments and have them ready when called for. I don't believe any of our neatness is ever wasted on the customer. [Applause.]

MR. LOEHR: It is all right to have your packages done up nicely, but without too much display. The general arrangement of your store is another thing to consider. If you make a great display of fine pictures, say—have everything fine about you—your customer from the country will go somewhere else, because he thinks you are charging him for it. A gentleman I know, in a college town of ten thousand people, spent a great deal on his store and received the congratulations of his friends; but he noticed his customers going around the corner to a store not so nicely fitted up, because they thought they could save money. Do not be too fine and make the impression with your customers that they are paying for it.

MR. PETTIT: How much Epsom salt do you gentlemen put in a package for five cents?

MR. HYNSON: I put a quarter of a pound.

MR. PETTIT: My customers get a half pound.

MR. SEARBY: What do you do where the other fellow sells it at two and a half cents a pound? I have known it advertised at that.

MR. ANDERSON: I would suggest in that case that the druggist keep two kinds—one that he advertises at two and a half cents, and the other to sell at ten cents. If when a man comes in and asks for the cheaper article, he will show him both, he will be very apt to buy the better one.

MISS WANOUS: I sell nothing but C. P. goods in my establishment, and if they want anything else they will have to go elsewhere. [Applause.]

MR. HYNSON (from the Chair): This package-goods business is quite an item to us. It is one of the most satisfactory and profitable parts of our business, and brings the fewest complaints. So far as our locality is concerned, it is a good one, I must admit—I tried to find one of that sort—but many people of moderate circumstances live there, and they seem to appreciate our efforts, as well as the rest of the people.

A MEMBER: As I now belong to the great purchasing public, I am in a position to offer a criticism of what I do not like in some instances. It is the little things that count. I refer to the putting-up of packages, and labeling them. I find that those druggists who supply me with packages, who want to be extra neat, paste their labels over the fold of the package, so that when I open my package it destroys the label, and I have to write

another. In some cases, the paste or gum penetrates, and the contents of the package will stick to the paper. In the matter of small open envelopes—envelopes intended to be open—I find that, in the majority of cases, these envelopes are sealed, and, in getting at the contents, I have to tear the envelope. The correct way is to have two envelopes, a small and a large one, the outer one to be sealed and the inner one to be left open. Another thing: I hope there is no one in this audience guilty of the practice of pasting one label over another. Many times men that you would not suspect of this practice will do that. They will even paste labels over castor-oil labels. I have had as many as six labels pasted over one another. This ought not to be done under any circumstances.

THE CHAIRMAN: In regard to the remarks of the last speaker, many of us, perhaps, will say "That is old;" but it is important, nevertheless. It is sad to think that, after all the teaching on this subject, such practices still prevail. This ought to carry a lesson to us all.

MR. RICE: You ought to judge the human nature of your customers as they come into the store, and the price will largely depend on the use to which they want to put the article asked for. I have sold calomel, for instance, from almost nothing up to $1.50 an ounce, depending on the use and the way it was put up.

THE CHAIRMAN: We have a great deal of material yet before the Section, and we must pass on. We have some other matters here that I would like to present. I especially want to get before the Section the question of prescription difficulties. I believe it will be a fruitful source of interest to us.

Mr. Diehl was here called to the Chair, and Mr. Hynson continued:

I want to call your attention to a paper here I have prepared.

A COMPILATION OF THREE SCORE AND MORE PRESCRIPTIONS.

BY HENRY P. HYNSON, PH. G., BALTIMORE.

The prescriptions collected last year, by the Committee on Practical Pharmacy and Dispensing seem to offer so many opportunities for pharmaceutical investigators to exercise their varied talents, that there appears to be little necessity to apologize for making a simple classified compilation of them. It is scarcely possible to say from what point of view do they present the most attractive form. The dispenser is interested because their study will prepare him for like difficulties that may overtake him and because of the occasion afforded to apply principles not often used; to the scientist they will probably disclose intricate and unusual combinations with unlooked-for results; to the educator they must certainly be of great interest, since they will, no doubt, lead him into the avenues of teaching not heretofore traveled; to the commercialist, also, they offer much food for discussion, because it may be seriously considered whether or not many of them, involving as they do sorry trials, much loss and annoyance, finally pay.

These prescriptions have a geographical significance as well, since they come from twenty-eight states, the District of Columbia and Canada; from the cities, towns and villages compassed within a territory reaching from the province of Ontario to Florida and, literally, from Maine to California.

They write history, since they include much of the new and remind us of some of the older articles of Materia Medica. They involve sociology as it relates to advancement; to ethics, as these affect, or not, the practice of a great profession and, finally, if we so will it, to progress, since they may be the touchstone which will at last try our skill.

It should be remembered that these prescriptions were not picked from a great many but were sent in response to a request to "kindly select, out of the last twenty-five prescriptions you have filled, the one that required the most pharmaceutical skill, the one that gave you the most trouble and annoyance, or the one that was the most difficult to prepare. If possible, add note, stating any peculiarity of manipulation followed." They were, in the majority of instances, no doubt, "the most difficult in the last twenty-five" filled by those from whom they came.

In reproducing this collection of prescriptions for publication we must, of necessity, lose much, very much of interest that was originally connected with them, notably, the chirography, orthography, terminations and abbreviations; all peculiar and startling, yet necessarily sacrificed to the printer's art.

By the committee, the seventy-eight prescriptions were divided into nine classes and here the same classification will be followed. It is thought the notes of the contributors, kindly added, will be interesting, although such did not, as will be seen, accompany every prescription. Those sent will follow, as quotations, the particular combination to which they apply. By far the largest class were mixtures and are first presented.

Take of—

Sulphurated potassa,
Zinc sulphate ..... āā ℥i.
Ether,
Alcohol,
Rose water, of each ..... q. s. ℥iv

Mix.

NOTE.—"Make paste of salts with rose water; add balance of rose water, then alcohol and ether."

Take of—

Quinine sulphate ..... ℥iss.
Dilute sulphuric acid ..... ℥ii.
Hydrocyanic acid ..... ℥i.
Manganese sulphate ..... ℈ii.
Tincture of colombo ..... ℥i.
Solution of pepsin ..... q. s. ad ℥iv.

Mix.

Take of—

Codeine ..... grs. viii.
Potassium iodide ..... ℥iss.
Ammonium muriate ..... grs. c.
Terpin hydrate ..... grs. xxv.
Syrup of white pine ..... ℥iii.

Mix.

NOTE.—"The above salts must be rubbed to a powder in order to have a solution of same, otherwise the terpin hydrate and codeine remain partly undissolved in conjunction with ammonia muriate and potassium iodide."

Take of—

Bromoform	℥ ii.
Sherry wine	℥ iij.
Syrup of orange peel	q. s. ad ℥ iv.

Mix.

NOTE.—"After consulting the physician, who thought there would be enough alcohol in the wine to dissolve the bromoform, we substituted, for some of the wine, 20 grs. pulverized tragacanth and 4 drs. mucilage acacia. This made an excellent emulsion."

Take of—

Oil of juniper	℥ iv.
Oil of sassafras	℥ iv.
Ammonia water	℥ i.
Chloroform	℥ i.
Spirit of nitrous ether	q. s. ℥ iv.

Mix.

NOTE.—"This family recipe has been filled in different drug stores for party who claims but few could make a clear mixture, though I did not meet with trouble. I did not add spirit of nitrous ether until a perfect mixture of other ingredients was obtained."

Take of—

Potassium citrate	℥ v.
Balsam copaiba	℥ i.
Fluid extract of hyoscyamus	℥ iii.
Syrup of acacia	℥ iii.
Peppermint water	q. s. ad ℥ vi.

Mix.

NOTE.—"Used quantity of powdered acacia required for making 3 oz. of syrup of acacia. Emulsified balsam with this, then added syrup and other ingredients."

Take of—

Iron citrate	℥ ii.
Quinine sulphate	℈ ii.
Tincture of nux vomica	℥ iss.
Spirit of wintergreen	℥ i.
Port wine	℥ iv.
Fluid extract of licorice	℥ i.
Water	q. s. ad ℥ viii.

Mix.

NOTE.—"I send you two of the last twenty-five filled. Neither gave any trouble, but I think either one requires some skill in compounding."

Take of—

Codeine	grs. iv.
Sodium iodide	℥ ss.
Creosote carbonate	℥ ii.
Calcium chloride	℥ ii.
Spirit of chloroform	℥ ii.
Tincture of cannabis indica	℥ iss.
Comp. syrup of hypophosphites	q. s. ad ℥ ii.

Mix.

NOTE.—"This prescription is rather a nuisance, especially when the creosote is oily, stiff and the patient in a hurry to 'catch the next street car' with temperature in store 50°."

Take of—
- Potassium chlorate ..... grs.xl.
- Comp. tincture of cinchona,
- Tincture of guaiac .....āā ℥iss.
- Honey ..... ℥i.
- Peppermint water .....ad ℥iv.

Mix.

NOTE.—"By adding guaiac, drop by drop, a very fair mixture can be made although some separation may occur."

Take of—
- Oil of sandalwood,
- Solution of potassa .....āā ℥iii.
- Tincture of opium ..... ℥i.
- Essence of anise..... ℥iv.
- Simple syrup .....q. s. ad ℥iv.

Mix.

NOTE.—"Make an emulsion of the oil of sandalwood, solution of potash and other ingredients."

Take of—
- Fairchild's pepsin ..... ℥ii.
- Bismuth subnitrate ..... ℥iv.
- Milk of magnesia .....q. s. ad ℥ii.

Mix.

NOTE.—"Will the alkaline magnesia have any effect on the pepsin?"

Take of—
- Guaiacal carbonate..... ℥iss.
- Terebene ..... ℥i.
- Milk of magnesia (Phillips) ..... ℥ii.
- Mucilage of acacia ..... ℥ss.
- Syrup of tolu .....qs. ft. ℥vi.

Mix.

NOTE—"The doctor had considerable trouble in getting this prescription prepared in a palatable shape. He brought in two that were filled at the most prominent drug stores in the city; both unfit to take. I prepared by mixing the 2 drams of acacia with syrup of tolu, adding the guaiacol and terebene and more tolu, lastly the milk of magnesia. A nice creamy mixture was the result."

Take of—
- Basham's mixture ..... ℥viii.

NOTE—"I prepared it as usual, but had it returned in 24 hours precipitated. I made then six times one fluid ounce and used the same material but varied the method of compounding it to find the difficulty. Every one differed from the other in color, and two of them precipitated. Having no time to follow it up, I procured fresh materials and have had no trouble since. I hold that the acetic acid contained impurities."

Take of—

Potassium chlorate	℥ ii.
Tincture of iron chloride	℥ iii.
Glycerin	ℨ i.
Listerine	℥ v.
Water	qs. ad. ℨ iv.

Mix.

NOTE—"Made without glycerin."

Take of—

Chloral hydrate	℥ iv.
Chloroform	℥ iv.
Oil of origanum	ℨ i.
Camphorated soap liniment	qs. ad. ℨ iv.

Mix.

Take of—

Potassium iodide	ℨ i.
Mecuric chloride	grs. iv.
Comp. syrup of sarsaparilla	ℨ ii.
Water, distilled	q. s. ℨ iv

Mix.

Take of—

Solution of strychnine hydrochlorate.	
Solution of arsenic hydrochloride	āā ℥ iv.

Mix.

NOTE—"This is one that causes uneasiness, as it is liable to precipitate."

Take of—

Strychnine sulphate	gr. ¼.
Solution of arsenic chloride	min. 70.
Atropine sulphate	gr. $\frac{1}{125}$.
Tincture of iron chloride	min. 96.
Comp. tincture of gentian	ℨ ii.

Mix.

NOTE—"The above prescription had us guessing at how to get the required quantities."

Take of—

Zinc sulphate	grs. ii.
Quinine sulphate	grs. iv.
Atropine sulphate	gr. i.
Morphine sulphate	grs. ii.
Cocaine muriate	grs. ii.
Sulphurous acid	℥ ss.
"Solution of bismuth and hydrastis citrate"	℥ ii.
Rose water	q. s. ℨ ii.

Mix.

NOTE.—"Charge 40 cts. Great pay for brains."

Take of—

Mercuric chloride	gr. 1½.
Resorcin	ʒi.
Lactic acid.	
Alcohol	āā ʒii.
Glycerin	gtt. x.

Mix.

NOTE.—"I cull this from the last twenty-five prescriptions. I could have sent you some of greater interest had you not limited the field of search."

Take of—

Pepsin, scale, (Fairchild's)	4.0.
Tincture of nux vomica	12 cc.
Dilute muriatic acid	8 cc.
Extract of malt (Trommer's)	60 cc.
Syrup of hypophosphites	60 cc.
Elixir of gentian	q. s. 250 cc.

Mix.

Take of—

Ammonium carbonate	ʒss.
Iron and ammonium citrate	ʒss.
Syrup of raspberry	ʒiv.

Mix.

NOTE.—"Makes an inky mixture; incompatible."

Take of—

Syrup of Dover's powder	ʒiss.
Syrup of quinine (tasteless)	ʒxivss.

Mix.

NOTE.—"What should be dispensed for "syrup of quinine (tasteless)?!" I used a formula, page 76, in Proceedings of Mo. Ph. Asso., by R. S. Vitt, 1898, gr. ii–ʒi."

Take of—

Elixir codeine and terpin hydrate	ʒiii.

Mix.

NOTE.—"Dispensed Blank's preparation for want of a good formula that would make a clear elixir. Have a formula but not satisfactory."

Take of—

Tincture of iron chloride	ʒii.
Strychnine sulphate	gr. i.
Mercuric chloride	grs. ii.
Dilute Hydrochloric acid	ʒii.
Syrup of lemon, enough to make	ʒiv.

Mix.

NOTE.—"We keep strychnine and corrosive sublimate in solution (gr. i to ʒi); upon adding solution of strychnine to corrosive sublimate solution, it formed a glutinous mass. Afterwards prepared by diluting separately, but the mixture looked bad. Put on, shake well."

Take of—

Red precipitate	grs. vi.
Ether	℥ i.
Boric acid	grs. xxx.
Oil of cloves	gtt. iv.
Carbolic acid	℥ ss.
Water	q. s. ℥ ii.
Atropine	grs. ii.
Tincture of aconite	gtt. xx.

Mix.

Take of—

Zinc sulphate,	
Salicylic acid,	
Iodoform	āā ℥ ii.
Boric acid	℥ iii.
Oleic acid	℥ viii.

Mix.

NOTE.—"Keep at the boiling-point for several hours; then pour off the liquid, and when cool, bottle."

Take of—

Ichthyol,	
Potassium iodide	āā ℥ i.
Glycerin	℥ i.
Water	℥ ss.

Mix.

NOTE.—"I mixed the ichthyol with nearly all the water, dissolved the iodide in the remainder and, after mixing this solution with the glycerin, added the ichthyol solution; but the resulting mixture is muddy looking; the ichthyol is precipitated. We often get combinations of ichthyol and soap liniment or other alcoholic preparations, and there is always a precipitation of ichthyol."

Take of—

Dilute nitrohydrochloric acid	℥ iv.
Pepsin, pure	℥ ii.
Strychnine nitrate	gr. i.
Tincture of capsicum	m. xv.
Fluid extract of cereus grandiflorus	℥ vi.
Chloroform water	q. s. ℥ ii.

NOTE.—"This was put up after cautioning patient in regard to large dose of cereus. It was returned showing a green precipitate, which had never occurred before. I requested patient to write to the physician, who changed the prescription by using only ℥ iii of the fluid extract and adding ℥ iv glycerin, which made a satisfactory mixture."

Take of—

Cocaine muriate	gr. iii.
Boric acid,	
Sodium biborate	āā gr. v.
Camphor water	℥ ss.

Mix.

Take of—

Quinine sulphate..... ℥i.
Strychnine sulphate ..... gr. i.
Dilute phosphoric acid ..... ℥vi.
Iron pyrophosphate..... ℥iiss.
Ammonia water..... ℥i.
Simple elixir ..... q. s. ad ℥viii.

Mix.

NOTE.—"Physicians say a perfectly clear mixture should be obtained. We have failed to get it."

Solution of aluminum acetate..... ℥i.
3 per cent.

NOTE.—"As aluminum acetate is not soluble in water, how should this be prepared—by double decomposition?"

Take of—

Tincture of aconite ..... ℥iss.
Quinine bisulphate ..... ℥ii.
Comp. tincture of gentian..... ℥i.
Salol ..... ℥iii.
Elixir of calisaya ..... q. s. ad ℥iv.

Mix.

Take of—

Strychnine sulphate..... gr. i.
Quinine sulphate.
Iron pyrophosphate ..... āā ℥ss.
Dilute phosphoric acid.
Syrup of ginger ..... āā ℥ii.

Mix.

NOTE.—"I dissolved strychnine and quinine in dilute phosphoric acid and the iron salt in the syrup, then mixed the two solutions."

Take of—

Zinc sulpho-carbolate..... ℥ss.
Dilute solution of lead subacetate..... ℥vi.

Mix.

NOTE.—"This forms a clear solution if lead solution is acidulated with acetic acid; if not, a milky mixture results."

Take of—

Saturated solution of boric acid,
Saturated solution of salol,
Potassium citrate,
Oil of wintergreen..... āā ℥ss.
Fluid extract of hyoscyamus..... ℥ii.
Lafayette mixture ..... q. s. ad ℥iv.

Mix.

Take of—

Fluid extract of bark, detannated	℥ ii.
Tincture of blood root	℥ iiss.
Iron pyrophosphate	℥ ii.
Dilute phosphoric acid	℥ iss.
Elixir of orange	℥ ii.
Syrup, enough to make	℥ viii.

Mix.

NOTE.—"Mixed fluid extract and tincture: dissolved iron in elixir, added syrup and, then, mixed the two liquids. Used solution of glacial phosphoric acid."

Take of—

Potassium bromide	℥ iii.
Arom. spirit of ammonia	℥ i.
Solution of lime	q. s. ℥ iv.

Mix.

Take of—

Sodium salicylate	20.0
Comp. tincture of gentian	15.0
Aromatic tincture	20.0
Wine of colchicum	5.0
Wine of pepsin	30.0
Water, to make	150.0

Mix.

NOTE.—"The difficulty was to get the aromatic tincture, which is not usually kept in American pharmacies."

Take of—

Salicylic acid	℥ ss.
Iron pyrophosphate	℥ i.
Sodium phosphate	gr. xii.
Water	q. s. to make ℥ viii.

Mix.

NOTE.—"This should form a ruby-red clear solution according to Potter's Therapeutics, 2d to 7th edition, under 'Rheumatism.' It requires about ten drams of sodium phosphate to dissolve four drams of acid salicylic, see U. S. D. under 'Acid Salicylic.' The prescription should read sodium phosphate twelve drams, as I always dispense it."

Take of—

Tincture of iron malate	℥ iii.
Elixir of calisaya	℥ vi.

Mix.

NOTE.—"This gave me considerable trouble, as I did not have tincture of iron malate and the prescription came at night. I finally secured it at a wholesale house."

Take of—

Iron arsenate	0.033
Potassium bromide	10.0
Simple elixir	60.0
Water	q. s. 120.0

Mix.

NOTE.—"Difficult to make solution."

Take of—

Antipyrin	4.0
Wine of ipecac	2.0
Tincture of aconite	1.50
Syrup of wild cherry	60.0
Water q. s.	120.0

Mix.

NOTE.—"Makes unsightly mixture."

Take of—

Salol	gr. xxii.
Oil of turpentine	drops xxx.
Antikamnia	grs. xxx.
Mucilage of acacia	ʒ ss.
Syrup of Yerba Santa enough to make	ʒ ii.

Mix.

NOTE.—"Dissolved salol in a little oil of wintergreen and made a smooth mixture."

Take of—

Protargol	gr. x.
Distilled water	ʒ vi.

Mix.

NOTE.—"Did not have product on hand; sent out for it. Being in the evening, was several hours until it was found, the wholesaler not being accessible. Statement was, that it was very soluble; placed it in a bottle and poured water on it; by shaking produced great amount of froth but no solution; after much work and time got the particles in mortar and, by triturating, got the solution finished. All that we could charge for it was fifty cents, for three or four hours work and worry."

Take of—

Sodium bicarbonate	ʒ ii.
Tincture of iron chloride	ʒ iv.
Mucilage of acacia	ʒ i.
Peppermint water	ʒ iss.
Syrup of orange peel	ʒ i.

Mix and make solution.

NOTE.—"This prescription is *bona fide* and was presented for compounding at a St. Louis drug store."

Take of—

Menthol,	
Thymol,	
Boric acid āā	gr. x.
Oil of eucalyptus	ʒ ss.
Carbolic acid	drops vi.
Liquid albolene	ʒ i.

Mix and make spray solution.

NOTE.—"How should this be manipulated?"

Take of—

Sodium glycerino-phosphate	℥ i.
Dilute phosphoric acid	℥ ss.
Iron phosphate	gr. xv.
Strychnine sulphate	gr. i.
Quinine sulphate	ʒ i.
Glycerole of pepsin	℥ i.
Water	℥ v.
Sherry wine, enough to make	℥ xii.

Mix and make solution.

Take of—

Elixir of sodium bromide	℥ ii.
Elixir of phosphate of iron, quinine and strychnine	℥ iv.

Mix.

NOTE.—"Gave me some trouble, as an unsightly mixture resulted. Sodium bromide threw out quinine. Added a little dilute acid hydrochloric."

Take of—

Tincture of nux vomica	ʒ iii.
Strontium bromide	ʒ ii.
Mixture of rhubarb and soda, enough to make	℥ vi.

Mix.

NOTE.—"This proved to be a mixture highly effervescent and was allowed to stand uncorked two hours before sending out."

Take of—

Sodium bicarbonate	ʒ vi.
Bismuth trisnitrate	ʒ iii.
Tincture of hyoscyamus	℥ i.
Comp. tincture of cinchona	ʒ i.
Comp. tincture of cardamon	ʒ iv.
Dilute hydrocyanic acid	ʒ iss.
Water, enough to make	℥ viii.

Mix.

NOTE.—"If this be corked immediately on dispensing it either blows the cork out or explodes the bottle. It must be left uncorked for some time to overcome the difficulty."

Take of—

Salol	gr. xxxii.
Mucilage	℥ i.
Bismuth subnitrate	℥ i.
Essence of pepsin	℥ iss.
Scale pepsin	grs. xxxii.
Simple syrup, enough to make	℥ iv.

NOTE.—"By dissolving the salol in a half drachm of almond oil with the aid of a little heat and then forming an emulsion with the mucilage, a very satisfactory mixture was obtained."

Take of—

Strychnine sulphate	grs. iss.
Mercury bichloride	grs. ii.
Tincture of iron chloride	ʒ i.
Dilute hydrochloric acid	ʒ i.
Fowler's Solution	ʒ iiss.
Glycerin	ʒ i.
Syrup of orange peel, enough for	ʒ vi.

Mix. Dose teaspoonful.

NOTE.—"This is a copy of a prescription that we often fill. Have spoken to the doctor about its dangerous character, but he wants it dispensed as written. Says that he likes his medicines 'strong, they act quicker.' We dispense with a shake."

Take of—

Terpin hydrate	grs. 1½
Creosote (Morson)	min. iv.
Codeine	gr. ½.

Mix and make one capsule. Dispenses 40 such doses.

Take of—

Exalgine	grs. xxiv.
Salol	ʒ ss.
Extract of nux vomica	grs. iv.

Mix and make 12 capsules.

Take of—

Iron sulphate,	
Potassium bicarbonate	āā gr. cc.
Powd. ext. of nux vomica	gr. xxv.
Iron arsenate	gr. iv.
Powdered althæa, q. s.	

Mix. Make mass and divide into 10 capsules.

NOTE.—"We found a mixture of glycerin and tragacanth a good excipient."

Take of—

Cerium oxalate	ʒ i.

Divide into capsules No. 12.

Take of—

Sodium salicylate	ʒ vss.
Salol,	
Pepsin	āā ʒ ss.
Strychnine sulphate	gr. ¾
Powd. digitalis leaves	grs. v
Powd. ext. of senna	grs. vi.
Podophyllin	gr. i.

Mix. Make capsules No. 30.

NOTE.—"These were dispensed in 00 capsules, dry."

Take of—

Extract of pichi	ʒ i.
White turpentine	ʒ i.
Oil of cubebs	gtt. xv.

Make capsules No. 30.

Take of—

Extract of nux vomica	grs. v.
Extract of cascara sagrada	grs. viii.
Extract of hyoscyamus	grs. x.
Camphor mono-bromate	℥ss.
Salol	℈iiss.
Oleoresin of capsicum	grs. iss.

Mix and divide into 16 capsules.

NOTE.—"Very hard to mass; becomes almost liquid."

Take of—

Arsenous acid	gr. i.
Quinine bisulphate	℥i.
Acetanilid	℥ii.
Extract of nux vomica, fld.	℥iss.
Extract of digitalis, fld	℥i.

Mix, make mass and divide into capsules No. 50.

NOTE.—"The prescribing of fluid extracts in pill masses is a common practice here. I massed this one with powdered licorice 2 drs. and powd. tragacanth 1 dr., filling number 2 capsules, solidly."

Take of—

Sodium bromide	℥i.
Chloral hydrate	grs. xxx.
Cocoa butter, sufficient quantity.	

Mix and make 4 suppositories, 30 grs. each.

NOTE.—"Moulded without much trouble by using a freezing mixture of ice and salt."

Take of—

Chloral hydrate	℥ss.
Cocoa butter	q. s.

Mix, make 6 suppositories.

NOTE.—"Used seventy-five grains of tragacanth and five grains of cocoa butter to make mass."

Take of—

Chloral hydrate	℥i.
Cocoa butter	q. s.

Mix and make 6 suppositories.

NOTE.—"Mixed the chloral hydrate with twenty grains of powdered tragacanth and proceeded in the usual way, using a slightly warmed spatula and shaping with hand."

Take of—

Protargol	grs. xxxiv.
Lead acetate	grs. iss.
Cocaine hydrochlorate	grs. iss.

Cocoa butter enough to make 6, number 16 bougies, 6 inches long.

NOTE.—"565 grains of cocoa butter required."

Take of—

Bougies short (urethral) No. xii.

2 per cent. protargol.

NOTE.—"The base is a gelatin one, composed of gelatin, glycerin and water. The protargol is dissolved in one drachm of water, gelatin base melted on water bath and

solution incorporated, then poured into bougie moulds 3 inches long, which have been previously well dusted with lycopodium. About one to two hours are necessary to put up the prescription."

Take of—
Creosote,
Iron sulphate ..... āā gr. xxx.
Strychnine sulphate,
Arsenious acid ..... āā gr. i.
Powd. digitalis ..... gr. xxx.
Mix and make 30 pills.

NOTE.—"Triturate strychnine sulphate and arsenic with five grains of milk sugar, and iron sulphate and digitalis; remove from mortar. Weigh creosote in homeopathic vial, pour in empty mortar and add powdered extract of licorice and kaolin, each twenty grains; rub together, add the mixed powders and glucose to make mass, which must be carefully "coaxed" into a pipe with the fingers and palm of the hand. Cut with machine, but do not roll with it; form pills with fingers. Result, a satisfactory pill containing *all* the creosote."

Take of—
Phosphorus ..... 0.25.

Dissolve by the aid of a little heat in oil of sweet almonds and cocoa butter each 8.0. Then mix with medicinal soap 8.0, powdered gentian root q. s.
Make two hundred pills and coat with gelatine.

NOTE.—"After a few experiments I found that the easiest way to apply the coating would be a hot gelatine solution."

Take of—
Quinine bisulphate,
Salol ..... āā ℥ss.
Resin guaiac ..... ℈ii.
Mix and make 20 pills.

NOTE.—"Not very difficult, but the mere fact that pills are ordered makes it odd, as fully 90 per cent. of such combinations are ordered in capsules. I used mucilage of acacia as an excipient in preference to any other."

Take of—
Quinine sulphate ..... ℥iss.
Extract of nux vomica ..... gr. xii.
Oil of savin ..... ℥ss.
Socotrina aloes ..... gr. vi.
Cantharides ..... gr. xxiv.
Mix and make 48 pills.

Take of—
Strychnine sulphate ..... gr. i.
Arsenous acid ..... gr. ½.
Phosphorus ..... gr. ⅓.
Pepsin ..... ℥iss.
Mix and make 30 pills.

NOTE.—"Prescription required quick manipulation. Warmed the phosphorus with chloroform and, after triturating the other ingredients thoroughly, added the phosphorus solution. Made pills which were coated with ethereal solution of tolu."

Take of—

Blaud's mass ..... ℥ii.
Phosphorus ..... gr. i.
Extract of nux vomica ..... gr. x.

Mix and make 100 pills.

NOTE.—"We do not consider above difficult in the least, but of course there is more or less trouble with manipulation."

Take of—

Pepsin ..... ℥iiss.
Ammonium chloride ..... ℥iv.

Mix and make 20 powders.

NOTE.—"Dispensed in wax paper."

Take of—

Ammonium muriate,
Potassium nitrate ..... āā ℥ii.
Powdered elaterium ..... gr. ii.
Resin guaiac ..... gr. xii.

Mix and make 12 powders.

NOTE.—"The doctor wrote 'guaiacii' and I had to find out that he wanted the resin, which took time."

Take of—

Calomel ..... gr. iss.
Milk sugar ..... gr. xx.

Mix. Triturate until a yellow color is obtained.

NOTE.—"The proportion of calomel to the milk sugar is too small to procure any perceptible color by trituration."

Take of—

Menthol ..... ℥iv.
Camphor ..... ℥iiss.
Methyl salicylate ..... ℥ii.
Lanolin ..... ℥iv.

Make ointment and dispense in collapsable tube.

Take of—

Balsam peru ..... ℥v.
Liquid storax ..... ℥i.
Ointment of zinc oxide ..... ℥vi.

Mix and make ointment.

NOTE.—"We dissolved the liquid storax, which had become quite hard, in 1 oz. alcohol with the aid of gentle heat and mixed it, adding the ointment gradually, with gentle stirring. This made a fine ointment."

Take of—

Ungt. Hydrarg. Ammon. nit. ..... ℥i.

NOTE.—"We have a persistent call from a physician for above."

Take of—
Salicylic acid ..... ℥i.
Oil of cade ..... ℥iiss.
Powd. zinc oxide ..... ℥ii.
Mix and make dusting powder.

Take of—
Pure pepsin ..... gr. xl.
Taka diastase ..... gr. xxx.
Bismuth subgallate ..... gr. xxx.
Ingluvin ..... gr. xx.
Mix and make twenty konseals.

Take of—
Oleo resin of male fern ..... ℥i.
Croton oil ..... gtt. i.
Powdered kamala ..... ℈ii.
Mix and make 8 capsules.

NOTE—"This looks easy, but can not be filled in the ordinary way; used long pointed syringe with fair size opening and injected the semifluid mass into capsules, being careful to fill from bottom up."

Comment was made upon these prescriptions in a general way by the Committee on Practical Pharmacy and Dispensing last year; further comment is purposely avoided here. The compilation is made simply to get this variety of prescriptions before the pharmacists of the country—and the teachers, with the hope that it will provoke healthy discussion in this and other pharmaceutical bodies.

I trust the contributors, "friends tried and true," will accept my work as a slight compliment to them; to it I add my hearty thanks and sincere best wishes.

Here are seventy-eight prescriptions, representing all parts of the country, from Maine to California, from Ontario to Florida. They show that if you have your troubles, other druggists have theirs as well. It is instructive to see how far from right are some of these pharmacists, and how well informed some others are. Let us take the first prescription to illustrate what can be done before this Section—and I hope the Section will pardon me if I am on the floor a good deal, but I want to get before you the work I have in mind—work that I think we should take up and discuss. Take this first prescription:

Take of—
Sulphurated potassa,
Zinc sulphate ..... āā ℥i.
Ether,
Alcohol,
Rose water, of each ..... q. s. ℥iv.
Mix.

NOTE.—"Make paste of salts with rose water; add balance of rose water, then alcohol and ether."

MR. HOLZHAUER: We have put up that prescription a great many times, and have no trouble when we dissolve the two salts separately, and then mix the two solutions.

MR. HEMM: What was the difficulty in this case?

MR. HYNSON: You see the note.

THE CHAIRMAN: It says, "Make paste of salts with rose water; add balance of rose water, then alcohol and ether."

MR. ANDERSON: I believe the process Mr. Holzhauer speaks of is the proper one. If you mix the sulphurated potassa and sulphate of zinc into a paste and then add more water and dissolve, you get a dark green mixture. This is intended for a face lotion. If you dissolve separately and mix them, you will get an impalpable yellowish precipitate, which is smooth, and that is the better way.

MR. HEMM: I have frequently had a prescription of similar composition presented to me for criticism and information. There is a certain wash made up of sulphate of zinc and potassium sulphite, which is dispensed in the drug stores of this city, forming a black compound, while dispensed at other hands there is formed a clear preparation of natural color.

MR. HYNSON: These prescriptions are accurate copies, and these notes are the actual notes added to the prescription by the druggist as to how he prepared them. They are not from the physician, but the notes are from the druggist, referring to the special prescription sent by him.

MR. RAPELYE: I have had considerable experience along this line, and I think the only proper method is that of Mr. Holzhauer, by making two separate solutions and mixing the two together, thus producing a fine creamy mixture which does not precipitate readily, but remains suspended a long time.

MR. SAYRE: How much of ether, alcohol and rose-water do you use here! Referring to this "q. s," what does that mean? Does that mean equal quantities of each? It does not say so.

MR. HYNSON: It says so, I think.

MR. SAYRE: "Of each, q. s," it says. I want to know how much of ether and alcohol and rose-water should be used.

MR. HYNSON: About eleven drachms each.

MR. STEDEM: We take it for granted that the physician meant an equal quantity of each.

MR. SAYRE; But would you feel warranted in putting it up in equal quantities of ether, alcohol and rose-water, as here written?

MR. STEDEM: Yes, sir, I would.

MR. REMINGTON: I do not think a pharmacist could do anything else than take equal parts of each. I think he would be compelled to do so, mixing them in equal proportions and making a mixture of four ounces.

MR. SAYRE: I do not think it is so ordered in the prescription.

MR. BATT: I do not think the dispensing pharmacist would use equal parts. This is a very common mistake. It is necessary to say equal parts.

MR. SHEPPARD: In our section it is a common thing to adopt this form, but I have rarely seen it applied to three liquids. It is exceedingly common applied to two liquids, and no druggist in our section would have the slightest doubt of the meaning of the doctor.

MR. EBERLE: I would suppose there was an omission made of "Quantities sufficient to make four ounces," and that the three would be equal.

MR. SAYRE: Suppose you should receive a prescription of this kind: "Tannic acid, alcohol, glycerin and rose-water, sufficient quantities to make four ounces." Would you use equal quantities of tannic acid and the other ingredients? This is a common prescription, and it is never put up that way.

MR. CASPARI: I think it is the custom the country over, that whenever the Greek term "ana." or the Latin "singulorum" is attached to a series of two or more articles it applies to the whole line preceding. That is certainly the custom in Europe and in this country. There may be individual cases where in certain localities a different meaning is applied, but the general understanding here and in Europe is, that equal quantities of all the articles covered by the term "of each," are to be used.

MRS. HALL: Is it customary for prescriptions to be written that way, of each enough to make a certain quantity?

MR. STEDEM: Quite common.

MR. ELIEL: I move we proceed, Mr. Chairman. At this rate we cannot get through with the business.

MR. HYNSON: My idea is to show that the pharmacists have something to discuss. It seems to me we had better consider only the prescriptions that have notes. Here is the next one:

Take of—

Codeine	grs. viii.
Potassium iodide	℥ iss.
Ammonium muriate	grs. c.
Terpin hydrate	grs. xxv.
Syrup of white pine	℥ iii.

Mix.

NOTE.—"The above salts must be rubbed to a powder in order to have a solution of same, otherwise the terpin hydrate and codeine remain partly undissolved in conjunction with ammonia muriate and potassium iodide."

This is a rather peculiar way of dissolving terpin hydrate, it seems to me.

Now let us take the last one on page 2:

Take of—

Oil of juniper	℥ iv.
Oil of sassafras	℥ iv.
Ammonia water	℥ i.
Chloroform	℥ i.
Spirit of nitrous ether	q. s. ad ℥ iv.

Mix.

NOTE.—"This family recipe has been filled in different drug stores for party who claims but few could make a clear mixture, though I did not meet with trouble. I did not add spirit of nitrous ether until a perfect mixture of other ingredients was obtained."

I do not understand his note, and simply wish to say that, if I had that prescription to put up, I would indulge in a little "substitution." Instead of using ammonia water I would use the alcoholic solution of ammonia gas.

MR. LILLIE: I have tried this prescription both ways, and it has always made a clear solution.

MR. DIEHL (in the chair): The prescription coming as a family prescription permits of the substitution of spirit of ammonia for water of ammonia, because to most persons spirit of ammonia and water of ammonia are synonymous. It being a family recipe and demanded clear, I believe that it would be the only way to obtain a clear solution.

Mr. Hynson takes the chair again.

THE CHAIRMAN: It is with the members of the Section to say whether we shall go on with this paper and take up these prescriptions with notes, from the various druggists. We have plenty of food for discussion to almost any extent. It has been suggested that we have an adjourned session to-morrow morning at the same time at which the Section on Scientific Papers meets.

MR. OLDBERG: I protest against a meeting of this Section simultaneously with the meeting of the Scientific Section.

MR. SHEPPARD: I move to continue this meeting for another hour.

Mr. Sheppard here called the attention of the chairman to the fact that the program of the Section showed that all papers competing for the prize of $50 offered by Dr. Sander must be marked "For competition." Mr. Hynson explained that this was a mistake, and that all papers were open for the prize.

MR. HYNSON (in the chair): Now let us turn to the suppositories and see these prescriptions for chloral hydrate suppositories. You will see the difficulties there, and how they have been overcome in some instances. Here are three prescriptions containing chloral hydrate:

Take of—
Sodium bromide..... ℥i.
Chloral hydrate..... grs. xxx.
Cocoa butter, sufficient quantity.
Mix and make 4 suppositories, 30 grs. each.

NOTE.—"Moulded without much trouble by using a freezing mixture of ice and salt."

Take of—
Chloral hydrate..... ℥ss.
Cocoa butter ..... q. s.
Mix, make 6 suppositories.

NOTE.—"Used seventy-five grains of tragacanth and five grains of cocoa butter to make mass."

Take of—
Chloral hydrate..... ℥i.
Cocoa butter ..... q. s.
Mix and make 6 suppositories.

NOTE.—"Mixed the chloral hydrate with twenty grains of powdered tragacanth and proceeded in the usual way, using a slightly warmed spatula and shaping with hand."

Mr. Hynson explained how the difficulties with this class of suppositories had been overcome in his store, by his manager, through his knowl-knowledge of the effect of castor oil upon cocoa butter.

Mr. Scoville: Our experience has been that a mass made in the cold and properly manipulated by hand is all right. With wax we find that the mass when first chilled is in nice condition, but after it stands for a day or two it begins to harden, and after that it cannot be melted in the hand. There is a peculiarity about the chloral suppositories; if they are chilled long enough they will not give any trouble. This other method of the use of castor oil is entirely new to me. The hand method is probably the most convenient way of making suppositories.

Mr. Caspari: One point in connection with the use of castor oil may be of interest. It may appear strange that by its use both in warm weather and in cold the difficulties of melting in the one case and crumbling in the other are fully met. I have used that method for more than twenty years in making suppositories, and it renders the mass plastic both in winter and summer. The oil must be used cautiously, however, and an excess be avoided.

Mr. Lowe: It is a poor rule that does not work both ways. [Laughter.]

Mr. Caspari: In our laboratory at the college I have told the boys for twelve or fifteen years past to use castor oil as an excipient, and they have used it with great success.

Mr. Hynson: We have had complaint of trional suppositories that they would not melt at all when applied. We thought we had discovered a nice idea when we found we could melt the trional in cocoa butter, but upon cooling it crystallizes and makes a hard mass, which will not fuse at the temperature of the body. We now powder the trional finely and mix with the cocoa butter when nearly cold.

Mr. Meyer: I have had some experience in making trional suppositories; I have the butter grated, mix with a little castor oil, and have had very little trouble with them.

Mr. Hynson: You will not have trouble unless you allow the trional to melt.

Mr. Hynson read the following paper by Frederick T. Gordon, pharmacist, of the United States Navy:

THE ALKALINITY OF GLASS-WARE, AND ITS RELATION TO PRESCRIPTION WORK.

BY FREDERICK T. GORDON, PHARMACIST, U. S. N.

The seemingly unaccountable precipitation of a solution of holocain, to be used in ophthalmic practice, dispensed in an ordinary four-drachm "homeo" vial, directed my attention recently to an examination of the quality of the pharmaceutical glass-ware now on the market, particularly prescription bottles. The instance referred to above was this: a one per cent. solution of holocain was made up with distilled water in the usual manner on a prescription intended for use in the eyes; when first made it was perfectly clear, but on standing for about fifteen minutes a gradual cloudiness was noticed, and in a short time there was a noticeable precipitation of fine crystals on the sides and bottom of the vial. This unusual

behavior of holocain could not at first be accounted for until the solution was tested and found to be slightly alkaline: then the cause of the alkalinity became the question. A similar solution made up with the same distilled water in a graduate remained perfectly clear for several hours, therefore it was evident that the trouble came from the homeo vial, and so it did, for on allowing distilled water to remain half an hour in another vial from the same box it was found to possess a perceptible alkaline reaction. A rinsing of a vial with dilute sulphuric acid first and with distilled water removed the surface alkalinity of the glass and permitted the dispensing of the prescription clear, and it remained so until used up.

With this as a hint to the solution of many unaccountable precipitations in alkaloidal solutions, an examination of the common kinds of prescription bottles was undertaken, samples of various makes being obtained from retail drug stores. These bottles were taken from their packing cases unwashed, the straw, dirt, etc., removed, and they were then rinsed as usual. Pure distilled water of perfectly neutral reaction was poured into bottles, a drop or two of test-solution of rosolic acid added, and they were then set aside for a week. At intervals of twelve hours each bottle was looked at to note any change in color of the water. With some bottles there was an immediate reddening of the water, showing easily soluble alkali in the glass; others were at first colorless, and gradually became darker and darker in color as the alkali was slowly taken up. At the end of the week the water was poured from the bottles into clean porcelain dishes and titrated with deci-normal sulphuric acid, four ounces (100 Cc.) being taken as the unit of measurement, there being, of course, one, two, three, four and eight-ounce bottles used. It was found that with those bottles in which the water had become darkest red that from 0.1 to 0.5 Cc. deci-normal acid was required to neutralize the alkalinity, others ranged from 0.1 Cc. down to a drop or two of the acid. One bottle, a four-ounce "French square," very clear and handsome looking, took 1 Cc. acid to neutralize the water, equal to 0.0056 Gm. caustic potash. This was the amount of alkali extracted by distilled water in one week only; the same bottle after standing filled with distilled water for a month required no less than 3.2 Cc. deci-normal acid to neutralize the water, but this was an exceptional case, the average being about 1 Cc. It was also noted that the water gradually dissolved alkali from the glass up to a certain point; after that no more was taken up, no matter how long it stood. Hot distilled water acted on the glass quicker and more energetically, taking up the alkali almost at once. At the same time "homeo" vials of one to four drachms capacity were tested; invariably these were found to give an alkaline reaction to distilled water, turning the rosolic acid solution red in a few minutes and giving an alkalinity represented by 0.5 to 1.5 Cc. deci-normal acid to 100 Cc. of water, after standing a week.

Now these experiments lead to but one conclusion—that the glass used

in much of the prescription ware on the market contains an appreciable amount of water-soluble alkali. The relation this fact bears to prescription work is that aqueous solutions of various medicines will extract this alkali from the glass, and, in case of dilute solutions of alkaloids, will cause more or less precipitation of the active ingredient. This was plainly shown by making up dilute solutions of cocaine, atropine and hyoscyamine salts in distilled water, with a neutral reaction, and letting them stand in bottles for several days. In several kinds of "homeo" vials there was noted after a day or so a very fine crystallization on the sides of the bottle, preceded by slight turbidity, and in one case, one-tenth of a grain of hyoscyamine, the full strength of the solution, was completely thrown out from four drachms of solution. Decinormal acid allowed to remain in such vials was found to lose in acidity very markedly as the time went on, the acid seeming to take out the alkali quicker than water, and the same effect was noticed with regular prescription bottles to a less degree. It was noted, however, that if acid was allowed to stand in a vial or bottle for a day or so and the bottle then rinsed with water until the rinsings were neutral, that such bottles did not impart any alkalinity to distilled water, even after a week's standing, the acid seemingly having taken up the surface alkali completely.

The kinds of glassware that gave the most marked reactions were the "homeo" vials and the cheaper grades of prescription bottles. These are made from so-called "lead glass," particularly the "homeos," used because of its cheapness and ease with which it is worked, and large quantities of sodic carbonate are used as an ingredient in the formula of such glass. The glass from which most "homeo" vials are made is soft, easily fusible, heavy and of good lustre and clearness, qualities that are imparted to it by the large amount of lead oxide and sodic carbonate used in its manufacture. The finer grades of bottles, those having a faint greenish or purple tint when viewed in their thickest part, have less lead in their composition and much less alkali, lime taking the place of soda. Bottles that are very clear, colorless, and showing a colorless or whitish fracture when viewed on edge, are made from the lead-soda glass and should not be used for dispensing solutions of alkaloids, as they contain quite an amount of water-soluble alkali. While it is difficult to get a prescription bottle nowadays that does not contain lead, bottles can be had that do not contain water-soluble alkali, and such bottles can be had by so specifying on orders. Unfortunately, the lead-soda glass makes the handsomer bottle, and will therefore be naturally preferred on account of its finer lustre, polish and sharpness of moulding; such glass is softer than a lime glass and not so brittle, and it is cheaper. There does not seem to be much choice in "homeos;" all I have seen are made of the soft lead-soda glass. Much of the cheap chemical glassware is made from this glass, and will, when new, give up alkali to water and acids. Fortunately, there is an

easily applied remedy for this condition, even with "lead-soda glass" bottles. It was shown by a number of experiments that while there is an excess of water-soluble alkali all through such glass, only the alkali on the surfaces exposed to the action of the contained liquid need be considered. Practically all of this alkali is removed by dilute acids in a short time and the glass is then very little acted on by water unless after very prolonged contact, such as would seldom be the case in prescription work. Therefore, the remedy for the alkalinity of lead-glass bottles is a thorough washing with a dilute acid. Practically this is best applied by allowing prescription bottles and "homeo" vials to remain twenty-four hours in a one per cent. solution of sulphuric acid after rinsing out the dirt from packing, etc., taking care that every bottle is filled with the acid water. A wooden tub will be found to be an excellent vessel for this soaking. After the soaking in acid the bottles are removed, drained and thoroughly rinsed in clear water, drained and dried as usual. Bottles so treated will be found to be practically free from water-soluble alkali, and may be used safely for dispenstng dilute solutions of alkaloids. Where large bottles are to be used to contain distilled water or liquids affected by alkalies, a preliminary soaking and washing with dilute acid will make them safe.

The question of the lead in such glass need not be considered in this connection. Of course, when working with flasks, beakers and test-tubes of such glass the possibility of the solution of lead by hot acids or alkalies must be taken into account, and that this is no theory was proven to the writer's satisfaction not long ago by the unaccountable appearance of lead in a solution of ammonium acetate made from strong acetic acid and ammonium carbonate in a cheap "lead glass" beaker. Acetic and nitric acids act most strongly on such glass; sulphuric acid, after removing traces of lead, seems to form an insoluble coating on the glass. Hence the recommendation above that dilute sulphuric acid be used for removing the alkali from gass bottles has also in its favor that it renders the lead insoluble in water.

Particular attention should be paid to the condition of "homeo" vials when used for dispensing small quantitles of solutions of alkaloids. The use of these little bottles is growing in favor, and such use may account for many cases of "instability of dilute alkaloid solutions." The subject, although one of mere detail, is worthy of the attention of the careful pharmacist, for no stone should be left unturned to secure absolute accuracy and permanence in dispensing medicines, especially simple solutions of powerful remedies. It is quite possible that lead-soda glass in bottles may be responsible for the precipitation from fluid extracts, containing alkaloids, for precipitating the alkaloids from elixirs, especially elixir of iron, quinine and strychnine, numerous prescriptions and certain tinctures. The alkalinity of glass-ware may also have an intimate connection with the keeping of many syrups, pepsin solutions and other galenicals of a delicate

nature. It is hoped that these brief notes will serve to attract attention to the subject, and to put pharmacists on guard against untoward results in the making and keeping of their preparations. Further work along the lines just mentioned would be well worthy of undertaking.

Mr. Caspari moved to refer for publication.

MR. HINRICHS: A friend of mine made a solution of chloride of mercury in water, and he obviated that trouble by using a green glass bottle.

MR. STEVENS: We now test all the glassware we get by boiling it well in water. Possibly some of the wonderful things we have heard of in regard to these homeopathic remedies have been due to the facts set out by Mr. Gordon. [Laughter.]

The motion to refer was put and carried.

MR. ELIEL: As it will probably not be my privilege to be with you to-night, I would like to bring up a little matter here, which I think this Section could take up with great profit to the pharmacists of this country. The field at the present time is not occupied at all, and what little is done in that line is done by the trained nurses. I refer to matters pertaining to hygiene, dietetics and sanitation. This field is absolutely unoccupied, except by the trained nurses, and is a broad one for the pharmacist. I hope this Section will take up this matter and solicit papers and discussions at our next annual meeting, in Philadelphia.

MR. STEDEM: I have a note from Mr. E. F. Kessler, giving a method for making creosote pills: Mr. Kessler recommends to drop the creosote on a small quantity of magnesia and then add a drop of water before massing with cosmolin.

Mr. Stedem also exhibited and discussed the operation of the new Allen suppository machine.

THE CHAIRMAN: Gentlemen: We have been in session quite a long while; the election of officers is a part of the program. We have several other papers it would be well to discuss, and the question comes up as to whether, with due courtesy towards the Scientific Section, we can have another session to-night or to-morrow morning. I will ask Mr. Diehl to take the chair while I make a motion that we meet to-morrow morning at 10 o'clock, in such room as we can get, and without the presence of the official stenographer.

Mr. Meyer seconded the motion.

Mr. Hemm moved to make it 9 o'clock, and Mr. Mayo seconded the motion, saying the members could all get to their business when at home by 8 o'clock the year round, and it did seem they ought to be able to get out to a session at 9 o'clock, when they were right in the hotel where the meeting was to be held.

MR. SHEPPARD: I believe in holding this Section-meeting, because I believe there are a great many men who will come here and do good work who are not in the Council, or connected with the college faculties or other institutions. I am, therefore, in favor of the meeting to-morrow morning.

The substitute to meet at 9 o'clock in the morning was adopted.

Mr. Hynson resumes the chair.

THE CHAIRMAN: I will entertain a motion now to adjourn until to-morrow morning at 9 o'clock.

MR. SLOAN: This Section has just reached a stage, now, that has been lost sight of for twenty years—we have lost sight of pharmacy. The interest in this Section shows that it is a good move.

MR. MAYO: Let the gentlemen interested in the Scientific Section attend here at 9 o'clock to-morrow morning, and they can move to adjourn at 10, and if they are in a majority they can adjourn the Section.

MR. SHEPPARD: It was a fundamental idea in the beginning that the Sections might be in session at the same time, and it will have to come to that in this body, I believe. It is not objectionable, I think, and the experiment is worth making.

The Section then adjourned to meet again at 9 o'clock to-morrow.

SECOND SESSION—FRIDAY MORNING, SEPT. 20, 1901.

An adjourned session of the Section on Practical Pharmacy and Dispensing was called to order by the Chairman at 9:30 o'clock Friday morning in that parlor of the Southern Hotel which had been used as the local secretary's office. Although the room was a comparatively large one, it was filled to overflowing during the entire session, plainly evidencing great interest on the part of the members in the work of this Section.

As the official stenographer was to be engaged in reporting the proceedings of the Scientific Section, and as no provision had been made for this extra session, a full stenographic report of its proceedings can not be given.

Mr. Stedem then took the chair, and Mr. Hynson read a paper by Mr. C. Osseward, as follows:

NOTES ON ARISTOL OINTMENT AND GELATIN CAPSULES.

BY C. OSSEWARD, SEATTLE, WASH.

A QUICK METHOD OF MAKING ARISTOL OINTMENT.

As we have a great many prescriptions for aristol ointment, I have done away with the powder, and keep on hand a paste which I make as follows:

I place one ounce aristol in a dry mortar and add just enough ether to form a paste; I then weigh out one ounce of olive oil and stir until a perfectly smooth paste is obtained. In about two hours all ether will have evaporated, providing the paste has been stirred well several times.

I keep this paste in a wide-mouthed glass-stoppered bottle (amber) and, by using twice the amount of paste for the quantity of aristol required, I can make a beautiful, smooth ointment in a few minutes.

Is a gelatin capsule insoluble under certain physiological conditions? Some time ago we received a prescription as follows:

Methylene Blue,
Oil of Nutmeg ..... āā ℥ss.
Oil of Santal ..... ℥i.
Make in capsules No. 30.

In dispensing prescriptions of this kind we generally use *soft* gelatin capsules, but when this particular prescription was brought in we happened to be out of the small size and, not being able to get them in the city, I dispensed the prescription using the hard empty capsules. I had some trouble in sealing them and, in spite of everything, they would leak. As a last resort I used a dilute solution of soft gelatin, one part of gelatin (such as we use in sealing soft capsules) to four parts of water, then by dipping the capsules in this weak solution I could seal them perfectly.

The prescription was sent out only to be returned four or five days later with the complaint that they did not dissolve properly, and the information that the doctor wished to have them made again, but in soft capsules.

The doctor explained to me afterwards that the capsules passed through the stomach undissolved, as the urine was perfectly colorless, but the stools were colored intensely blue.

The prescription was again filled, this time in the soft capsules, when they dissolved perfectly; the urine being colored very strongly. Could this be due to the condition of the patient; or could it be the capsules? As this appeared to me somewhat peculiar, I thought it worth mentioning.

Mr. Hynson said this was a specimen of just such papers as he liked to see presented to the Section; it was thoroughly practical. He had used a very similar method for making aristol ointment and could heartily commend it. This ointment, with a petrolatum base, had been almost an impossibility until this method was discovered. The substance is soluble in fixed oils and fats, but not in so-called mineral oils. He had not found the ether necessary; simple tituration with an equal quantity of oil would secure a translucent, semi-solid mass. Later, he had found this could be accomplished, in a very short time, by gently heating the oil and aristol in a capsule over a water-bath.

Mr. Hynson also read a paper by H. A. B. Dunning and himself:

A NEW FORMULA FOR BLAUD'S IRON PILLS.

BY H. A. B. DUNNING AND H. P. HYNSON, BALTIMORE.

All pharmacists have had occasion to make Blaud's pills, and have had more or less trouble in compounding them. There have been numerous formulas suggested and used for this pill; the one most extensively employed in former years was the original French formula, mentioned in the U. S. Dispensatory, 1880. This called for equal weights of potassium car-

bonate and ferrous sulphate, to be made into a pilular mass with mucilage of tragacanth and powdered licorice root. The excess of potassium carbonate rendered the mass hygroscopic and made it very difficult to manage.

The official formula is: Ferrous sulphate, in clear crystals, 16.0; potassium carbonate, 8.0; sugar, 4.0; tragacanth, in fine powder, 1.0; althæa, in No. 60 powder, 1.0; glycerin and water q. s., 100 pills. As one part of pure crystallized ferrous sulphate requires, for complete decomposition, 0.497 + part of potassium carbonate, it appears that the aim of the Pharmacopœial formula is to have present just about enough potassium carbonate to decompose the ferrous sulphate. This would require that absolutely pure potassium carbonate should be used; that, however, is impracticable, the potassium carbonate largely used by pharmacists not being more than 95 per cent. K_2CO_3. Professor Caspari, Maryland College Pharmacy, suggests that for each 240 grains of crystallized ferrous sulphate, there should be used 140 grains of potassium carbonate, thereby insuring sufficient carbonate for the complete decomposition of the iron sulphate, and, in his formula, suggesting the change in the amount of potassium carbonate, acacia is used to replace the tragacanth, which will be found to give somewhat better results.

In the three formulas mentioned above, as well as all others with which we have come in contact, tragacanth, acacia, or some other like substance, is used as excipient. Blaud's mass made with tragacanth becomes so tenacious and leathery that it is almost impossible to make a uniform pill of good appearance, even though the operator be expert and has had long experience with this pill; on the other hand, acacia causes the mass, and subsequently the pills, to crack and crumble. In both cases the mass has to be rolled out hurriedly and the pills must be quickly shaped, generally resulting in unevenly divided and poorly finished pills; therefore, the substances which cause so much trouble should, if possible, be excluded.

Summing up, it seems that what is desired is a formula for Blaud's pills which will insure a homogenous *pilular* mass, that will allow ample time to roll out, cut and shape without undue haste; a pill of uniform size, good appearance, and lastly, pills which will remain exposed for some time without apparent oxidation. Aiming to secure this end, I submit the following: Ferrous sulphate, in clear crystals, 240 grains; potassium carbonate, 140 grains; sugar, 20 grains; licorice root, powdered, 100 grains; glucose, sufficient quantity, with the following directions for preparation, which must be closely observed: Rub the ferrous sulphate into fine powder with the sugar and mix with the potassium carbonate, previously powdered; then rub these mixed powders to a smooth paste, continuing until an almost dry powder results; add the powdered licorice root, and thoroughly mix; mass with glucose, being careful to use sufficient of the latter. Continue the working of mass until it becomes solid and of good pilular

consistence, being especially careful that it is kneaded until there is no swelling of mass. Roll out at leisure. The large amount of glucose not only prevents the pills from oxidizing, but also tends to keep them soft, while, apparently, not increasing their size.

In a trial of this formula with that of the U. S. P., by thirty-five senior students of the Maryland College of Pharmacy, the results from the modified method were invariably better, although none of the students had had any experience with this, and many had much experience with the U. S. P. method. The only criticism upon the modified formula was that it required more time, which, in our opinion, is an advantage, looking at the matter in the light of *allowing* more time, not requiring. Unsatisfactory results followed only when complete reaction was not secured; when sufficient glucose was not used; or when the mass was not properly kneaded.

This formula has been used for several years in our prescription department, with the greatest satisfaction.

In conclusion, attention is called to the fact that some few physicians in this city, Baltimore, are prescribing ferrous sulphate with sodium bicarbonate, ordering the mixed powders to be dispensed in dry capsules. This can be safely done by adding of 15 to 20 grains of starch to each 60 grains of ferrous sulphate, mixing well and subsequently adding the sodium carbonate.

The reader emphasized the necessity of using a very large quantity of glucose; too much, strange to say, was hardly possible. He also called attention to the fact that the mass must be kneaded until the reaction was complete and all carbon dioxide eliminated. The strong point in the formula was that the mass, if properly made, could be kept for several days and rolled out at leisure, something impossible with the U. S. P. method.

Mr. Sennewald said he had had pills made by this formula at the request of one of the authors of the paper, and had found the process a very long one. It required so much more time than the official formula that he thought it impracticable. He had not, however, used so large an amount of glucose as was now suggested by Mr. Hynson. Yet he did not think his customers would wait for pills made by such a formula.

Mr. Hemm approved the formula and thought, from a trial, also at the request of one of the authors, that about two grains of glucose to each pill would be the requisite amount, although even more might be used.

Mr. Ebert said, from a chemical point of view, glucose was a mixture of dextrose and glucose; that dextrose was the desirable constituent for an excipient and, as the confectioners' glucose contained a larger proportion of the glucose, it was to be preferred by the pharmacist.

Mr. Searby endorsed this statement of Mr. Ebert.

Mr. Joseph W. England then read the following paper:

IMPROVED FORMULA FOR AROMATIC SPIRIT OF AMMONIA.

BY JOSEPH W. ENGLAND.

Few of the official preparations are so generally used with such satisfactory results as the official aromatic spirit of ammonia. It is not simply a solution of the official ammonium carbonate in alcohol and water flavored with volatile oils, but a solution of normal ammonium carbonate. As is well known, the official ammonium carbonate is a mixture of ammonium carbamate ($NH_4.NH_2.CO_2.$), and ammonium acid carbonate ($NH_4.HCO_3.$). On solution in water, the carbamate unites with water to form normal ammonia carbonate ($(NH_4)_2.CO_3$), while the acid carbonate remains unchanged. The addition of ammonia water as in making aromatic spirit of ammonia changes the acid salt into the normal salt. Hence, the official spirit is a solution of the normal carbonate alone. The main value of this lies in the fact that the normal salt is more efficacious therapeutically than the acid carbonate, of which latter the official carbonate contains about one-half.

It has been proposed (Proceedings A. Ph. A., 1900, 266, by William C. Alpers) to use stronger water of ammonia in place of the ammonium carbonate in making the official aromatic spirit of ammonia, on the ground that it is difficult to obtain a carbonate that answers all the requirements of the U. S. Pharmacopœia. But in my experience this objection is not well founded. It is possible to obtain translucent ammonium carbonate, and it is possible to keep it so by wetting it from time to time with small quantities of ammonia water or keeping it in an atmosphere of ammonia gas, so that the carbonic acid gas of the air does not change the normal salt into acid carbonate.

The use of translucent ammonium carbonate in the making of this spirit is very important, because the more translucent it is, the more normal salt it is apt to contain, and the more normal salt present, the higher the therapeutical value of the product, for it is a well-known clinical fact that the hard translucent crystals of ammonium carbonate are superior as a diffusible stimulant to the human economy than the acid ammonium carbonate or ammonia water. In fact some physicians in prescribing solutions of ammonium carbonate always specify "hard lumps" because clinical experience has taught them that this form of the salt yields the best results. Apart from its weakness as a diffusible stimulant, ammonia water is quite caustic to mucous surfaces.

The following formula I devised some years ago while on duty at the Philadelphia Hospital. It has several advantages over the official formula.

Ammonium carbonate (in translucent pieces.)	500 grs.
Ammonia water	2 fl. oz., 7 fl.drs.
Oil of lemon	2½ fl. dr.
Oil of lavender flowers	15 min.

Oil of nutmeg		15 min.
Oil of peppermint		45 min.
Alcohol		1½ pints.
Water	q. s.	2 pints.

To the ammonia water contained in a flask add 4½ fl. ozs. of distilled water, and afterwards the ammonium carbonate reduced to a moderately fine powder. Close the flask and agitate the contents until the carbonate is dissolved. Introduce the alcohol into a bottle of suitable capacity, add the oils, then gradually add the solution of ammonium carbonate, and afterwards enough distilled water to make the product measure 2 pints. Set the liquid aside during twenty-four hours in a cool place, occasionally agitating, then filter it in a well covered funnel. Keep the product in glass-stoppered bottles in a cool place.

While the official aromatic spirit of ammonia has a grateful odor, its "soapy" taste on dilution with water can be practically overcome by the association with it of oil of peppermint, the preparation being very acceptable to the stomach. In fact, such a spirit can be used with advantage, to replace the well-known "soda mint" (which decomposes and loses strength in time) by dissolving 5 or 10 grains of sodium bicarbonate in a teaspoonful of water and adding about 10 minims of the spirit. Further, the addition of the spirit to an effervescing draught of a "Seidlitz powder" makes the latter very grateful to a sick stomach.

Aromatic spirit of ammonia is a neutralizant, stimulant and antispasmodic; with the addition of the oil of peppermint it becomes also an antiseptic. It is of use in sick headache entirely due to flatulence, also in hysteria. Oil of peppermint, or its menthol, is a local stimulant and anæsthetic, having a direct paralyzing influence upon the peripheral nerve fibres, and being a bactericide, is of especial value in fermentative conditions of the alimentary canal, and as a sedative to the gastro-intestinal mucous membrane in nervous vomiting and nervous diarrhœa.

A sample of the aromatic spirit of ammonia made by the formula suggested is herewith submitted.

Mr. Mayo suggested that oil of spearmint might be substituted for the oil of peppermint, in the proposed formula, with much advantage, stating that the former oil was more agreeable in flavor and more generally acceptable. It was soon evident that both flavors had about an equal number of adherents. The matter was, finally, referred to the Committee on Revision of the Pharmacopœia.

Mr. Hynson said that he had made a suggestion regarding this preparation in one of his supplemental reports, which was, that the solution of ammonium carbonate and water of ammonia be allowed to stand for at least *four days* before the alcoholic solution of oils is added in small quantities, allowing the mixture to stand a few minutes, after each addi-

tion and thorough shaking, before adding the next portion. All this is to prevent the precipitation of the insoluble acid carbonate.

Mr. Stedem stated that even after this precipitate had been thrown down it could be redissolved by very violent and continuous shaking.

Mr. Meyer said that he had accomplished the desired result by *slowly* passing the alcoholic solution of oils into the bottle, containing the aqueous solution, through a funnel, the neck of which had been packed with absorbent cotton. The funnel should, of course, be covered.

Mr. Kennedy said he could never understand why any one should have had trouble with aromatic spirit of ammonia, as he had prepared it in gallon quantities, successively for thirty years, according to the Pharmacopœia directions, and had never had a precipitate.

The paper upon motion was referred to the Committee on Revision of Pharmacopœia and was ordered to be published.

Mr. Hynson resumed the chair and Mr. C. Lewis Diehl, Chairman of the Committee on National Formulary, read his annual report in abstract, which was listened to with marked attention and is, in full, as follows:

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY,

Mr. President and Members of the American Pharmaceutical Association: If it is necessary that I should apologize for formulating this report in the first person singular, I desire to say that I have elected to do so on several grounds, the chief one being that the work of the committee has not yet advanced sufficiently for the presentation of a report upon which all the members can unqualifiedly agree. This is not to be understood, however, to mean that there is any disagreement or lack of harmony among the members of the committee, but rather that in the course of my correspondence with them it has developed that individual views on some points, particularly those relating to the scope of the work, are at variance with each other, and differ from the views heretofore conceived by me to be essential to the utility of the Formulary. The present report should therefore be considered in the light of detailed resumé of the preliminary work done, of the criticisms made in the literature, and of the views expressed and suggestions made by the members of the committee, and others, together with such other information as may be of service to the committee in order to agree upon and formulate a final report and revision.

It may be well first of all to review some of the existing differences and their causes. When looking up some of the formulas recommended by the Missouri Pharmaceutical Association in 1898, I was struck with the views expressed during the discussion by one of the speakers—a member of our Association, now a manufacturing pharmacist, but, as I believe, formerly a dispensing pharmacist—which are given as follows: "He did not think the National Formulary was gotten up in a way to expedite matters and save labor. He did not like the idea of having so many stock elixirs. He did not consider the formulas of the National Formulary good working formulas. He pointed out the fact that in making up he National Formulary preparations you are frequently compelled to make up two or three other preparations, all used as principal in the original preparation." Clearly, this gentleman takes a very one-sided view in reference to stock elixirs and their utility, and evidently either ignores or has failed to read the prefaces to the Formulary, which point out clearly that one of the distinctive merits of the Formulary is the ease and convenience with which the dispensing pharmacist can supply most of the preparations by keeping a small, designated number of preparations in stock. It was

with this object in view that I suggested, early in the seventies, a "simple elixir" and a "wine of orange" for the convenient preparation of the elixirs and wines then in vogue, and this idea has been followed and augmented in all the Formularies that have since been adopted and published by pharmaceutical bodies. As to the merits of the formulas as "working formulas," we can well understand that they might be more desirable on a manufacturer's scale if modified, or if each formula was complete in itself. It must be remembered that these formulas are intended for the convenience of the dispensing pharmacist, and to encourage him to make his own preparations rather than to purchase them from the manufacturer. But if the criticism is a just one, it may well be asked why the critic quoted has not, after three years now passed, found it proper to offer "good working formulas" for any or all of them. I do not believe that any member of this committee holds the extreme views expressed by this member of our Association, though I am aware there are others who have found fault with the Formulary in similar directions.

Coming now to criticism, unfavorable and otherwise, by members of the committee, there is one made by a member upon which some definite agreement must be reached. It concerns the admission into the Formulary of preparations dropped from the Pharmacopœia, and is expressed thus: "I am not in favor of making a waste-basket of the Formulary, for everything that is dropped from the Pharmacopœia. There may be a few preparations that will be dropped that it would be advisable to add to the Formulary, but so far I think the number is very small." To explain my own view on this subject, I cannot do better than to reproduce my reply, which was as follows: "I have given your remarks concerning the admission into the Formulary of articles dropped from the U. S. P. some thought, but cannot agree with you except in so far that the Formulary should not be made a "waste-basket" for *everything* dropped from the Pharmacopœia. I am decidedly of the opinion that every *formula* for a medicinal preparation that is dropped from the U. S. P. should go into the National Formulary, unless the formula is replaced in the U. S. P. by another for the same preparation. Considering that the revision of the U. S. P. takes place but once in ten years, and that it is not likely that many formulas will be dropped at each revision, this does not greatly increase the number of formulas in the National Formulary from this source. You must consider the practical side of the question. It may be well enough, and it doubtless is necessary, that certain obsolete preparations should be dismissed at each revision. But it does not follow that this dismissal will prevent the use of the preparation, and the formula should therefore be preserved for convenient reference in some work accessible to pharmacists. I have been practically engaged in the business of dispensing medicine in a retail pharmacy for upwards of forty years, and could point out many difficulties encountered because of the absence of authoritative formulas for the so-called obsolete preparations. I have, moreover, a library that covers the ground very completely; but among all the books in my possession I have found none to serve me better purpose than a work with which you are doubtlessly well acquainted, namely, "Dunglison's Medical Dictionary." This, among other things, gives formulas for almost every preparation that had been in use by American and British practitioners of medicine up to the date of its publication; yet you would hardly apply the term "waste-basket" to this work, on this account. That I am not singular in advocating the admission into the National Formulary of formulas dropped from the U. S. P. will appear in the following quotation from a circular letter of the late Dr. Chas. Rice to the members of the U. S. P. Revision Committee (Circular No. 15, p. 36, Aug. 16, 1900): "The dismissal of an article not worthless in itself, however, from the Pharmacopœia will not necessarily render it a forlorn outcast. The National Formulary of Unofficial Preparations, inaugurated and maintained by the American Pharmaceutical Association, will be glad to take it up and provide for it a home and asylum, until it dies of desuetude."

In a similar direction to the foregoing adverse criticism are those of Mr. Wm. Mittelbach, who writes under dates of October 30, 1900 and August 9, 1901, to the following effect: "There is danger of having too many formulas. Only the best and most practical ones should be admitted. None should be given for fluid extracts, because the retail pharmacist does not prepare them anyhow." Then, alluding to certain formulas proposed, Mr. Mittelbach says in effect: "The addition of the Cincinnati Academy of Pharmacy formulas would make the Formulary unwieldy. Does not approve their admission. Points to the New York and Brooklyn Formulary as his ideal—a small, neat, compact Formulary. While the National Formulary cannot be reduced to that size, quite a number of formulas can and ought to be eliminated. Let us have a formulary of bases or vehicles to assist the physician in disguising nauseous medicines, but let him make the prescription."

Compare these criticisms of Mr. Mittelbach with the following suggestions by Mr. F. W. E. Stedem, communicated to me under date of August 14, 1901, and we have two diametrically opposed views on the same subjects by practical pharmacists engaged in dispensing medicines. Mr. Stedem says: "I am in favor of the admission of many of the formulæ of the Cincinnati Academy of Pharmacy; and I have thought that in connection with the work outlined by Prof. Stevens it would be well to exhibit some of the preparations in that formulary, having in view their possible admission because of the fact that they would fill a certain want. I have had a pet theory in mind, but which I have almost feared to make known to you because of the vastness of the work entailed in carrying it out. There are many old formularies in the market, some of which contain information as to preparations that is of great interest and use to the every-day, active pharmacist. It has occurred to me that we might incorporate into the National Formulary a comprehensive index of all these formulæ, giving the title of the preparation, the name of the originator and the page in the original book in which the formula might be found. That would mean a great deal of work, and yet I am quite sure would frequently result in giving information on obscure subjects and preparations, the formula for which need not necessarily appear in the National Formulary."

This much by way of illustrating, in some degree, possible points of controversy; and now to an account of the practical work accomplished. My time having been fully occupied with other Association work, and there being no pressing necessity for immediate organization of the Committee, I addressed on October 23, 1900, a circular letter to the members, special and auxiliary, in which I submitted the following plan for organization and work:

"That the work of the Committee be apportioned for the present among three Sub-Committees whose respective duties may be outlined as follows:

"I. *Sub-Committee on Additions.*—To consider the advisability of admitting preparations that may be suggested in the current literature, by state and local Associations, or by individuals, and to pass upon them for experiment and construction of formulas.

"II. *Sub-Committee on Construction of Formulas.*—To test the formulas submitted, and if found practicable, to construct and simplify them in harmony with the text of the National Formulary.

"III. *Sub-Committee on Correction of Formulas.*—To gather criticisms, adverse or otherwise, concerning the formulas now in the National Formulary, or that may be introduced, and to make necessary and possible corrections.

"Furthermore, the individual members of the whole Committee, special and auxiliary, should make it their business to ascertain from the literature, their acquaintances, and all other possible sources, what preparations not now in the National Formulary are desirable for introduction, including criticisms of existing formulas, and report these from time to time to the Chairman of the General Committee, so that he may refer them to the proper sub-committee. The members of each sub-committee will of course report

to their Chairman upon all matters that may have been assigned to them by him; but the Chairman of each Sub-Committee will be required to report direct to the Chairman of the General Committee."

The responses to this circular letter came in promptly, so that by November 18, 1900, I was enabled to announce the following Sub-Committees in almost absolute compliance with the preferences expressed by each member at my request:

I. *Sub-Committee on Additions.*—C. S. N. Hallberg, *Chairman;* Geo. A. Diekman, Edw. Raeuber, F. W. Meissner, Jr., Louis Emanuel.

II. *Sub-Committee on Construction of Formulas.*—W. L. Scoville, *Chairman:* Wm. C. Alpers, C. A. Rapelye, Wm. Mittelbach, E. G. Eberle.

III. *Sub-Committee on Correction of Formulas.*—A. B. Stevens, *Chairman;* H. P. Hynson, F. W. E. Stedem, Chas. Caspari, Jr.

As an almost immediate result several members of the committee suggested a number of preparations—by title, but with the explanation that formulas could be supplied, and these were communicated to each member in a circular letter of January 12, 1901, under "Exhibit A," here reproduced, which also includes the formulas of the Cincinnati Academy of Pharmacy, designated thus: No. 1, A. P., No. 25, A. P., etc., a copy of this Formulary, as well as an interlined copy of the National Formulary, being also sent for individual use and information. Along with this a list of references and criticisms on formulas kindred to those in the National Formulary, compiled by myself from the Proceedings from 1890 to 1900 inclusive, was also sent, designated as "Exhibit B," and this is also here reproduced, this latter being intended for the convenience of the Sub-Committee on Correction of Formulas.

EXHIBIT A.

Preparations Proposed for Introduction into the National Formulary.

1.	Angostura Bitters Flavor		Eberle.
2.	Elixir, Acid Salicylic Comp.		Eberle.
3.	" " " with Iron		Eberle.
4.	" Aletridis Comp., No. 1, A. P.		Eberle.
5.	" Ammonium Valerianate with Morphine		Eberle.
6.	" Bromides and Iodides.		Eberle.
7.	" Buchu, Juniper and Acet. Potash (Compare No. 39, N. F.)		Eberle.
8.	" Cinchona Comp. (Sim's Elixir of Calisaya.)		No. 3, A. P.
9.	" Diuretic		No. 2, A. P.
10.	" Gentian and Taraxacum Glycerinated (Glycerin Tonic.)		Scoville.
11.	" Hydrangea and Lithia Comp.		Eberle.
12.	" Hydrargyri, Arsenici et Ferri (Three Chlorides?)		Eberle.
13.	" Iodides (Three Iodides?)		Eberle.
14.	" Panax (Ginseng) Comp.		Eberle.
15.	" Pepsin Comp., Lactated (Compare Elixir Digestivum Comp., No. 50, N. F.)		Scoville.
16.	" Saccharin (Compare Liquor Saccharini, No. 59, N. F.)		Scoville.
17.	" Salol		No. 4, A. P.
18.	" Saw Palmetto Comp		Eberle.

19. Elixir, Sodium Salicylate Comp. ..... No. 5, A. P.
20. " Terpin Hydrate ..... Scoville, Eberle.
21. " " " with Codeine ..... Scoville, Eberle.
22. " " " with Heroin. ..... Scoville, Eberle.
23. " Tonga with Salicylates ..... Eberle.
24. " Triticum ..... Eberle.
25. Emulsion, Castor Oil, Palatable ..... No. 7, A. P.
26. " Cod Liver Oil ..... Eberle.
(Made with egg and containing brandy.)
27. " Cod Liver Oil Comp ..... No. 6, A. P.
(Made with egg and containing Creosote.)
28. " Iodoform ..... Scoville.
29. " Pepo Comp. ..... Scoville.
30. " Petroleum ..... Scoville, Eberle.
31. " " Compound ..... Eberle.
32. Essence, Pepsin ..... Scoville.
33. Extract, Cascara Arom. Fluid ..... Scoville.
34. " Pinus Canad. Fluid. (Dark.) ..... Eberle.
35. " Senna Arom. Fluid ..... No. 8, A. P.
36. Ferrum Albuminatum, Dry ..... Diehl.
(References: Proceedings 1870, p. 358; 1879, p. 120–128; 1879, p. 535; 1880, p. 358; 1882, p. 449–450; 1886, p. 651; 1888, p. 449; 1889, p. 738; 1890, p. 111–123; 1894, p. 206 and 730.)
37. Ferrum Peptonatum, Dry ..... Diehl.
(References: Proceedings, 1882, p. 459; 1889, p. 739–745; 1890, p. 117–119; 1994, p. 531; 1896, p. 431; 1899, p. 776.)
38. Formaldehyde. Definition of Characters ..... Eberle.
39. Liniment, Stillingia ..... No. 9, A. P.
40. Liquor, Acid Picric ..... Eberle.
41. " Alumini et Sodii Acet. ..... No. 10, A. P.
(Solution Buroxii.)
42. " Antiseptic. No. 11, A. P. ..... Eberle.
(See Liq. Thymoli Co., No. 54.)
43. " Auri et Arsenii Iodidi ..... No. 12, A. P.
44. " Cresoli Comp. ..... Scoville.
(Creolin. Compare Liq. Cresoli Saponatus, Proceedings 1899, p. 444.)
45. " Ferri Albuminatis ..... No. 13, A. P.
46. " " et Mangan. Pepton. ..... No. 14, A. P.
47. " " Peptonatis ..... No. 15, A. P.
48. " " Salicylatus ..... No. 16, A. P.
49. " Hydrarg. et Amm. Chlor. ..... No. 17, A. P.
(Vansweiten's Solution.)
50. " Hydrastini Comp. ..... Eberle.
51. " Hypophosphitum ..... Scoville, Eberle.
(Compare Form. No. 225, N. F.)
52. " Morphinæ (Bi) Meconatis ..... No. 18, A. P.
53. " Sodii Phosphatis ..... Eberle, Scoville.
(See Sodii Phosph. Liquefactus, No. 65.)
54. " Thymoli Comp. ..... Scoville, Eberle.
(To replace Listerine.)

55. Magnesia, Hydrate ..... Eberle.
(Milk of Magnesia.)
56. Oleatum Ammonii Liquidum ..... No. 19, A. P.
57. Petrolatum Album, Solid and Liquid ..... Eberle.
(Definition of Characters, &c.)
58. " " Liquid. Combinations suitable for nasal and laryngeal affections ..... Eberle.
(Camphorated, Mentholated, Benzoinated.)
59. Phenolum Camphoratum. Liquid and Dry ..... Eberle.
60. Pulvis Acetanilidi, Ammoniatus ..... No. 20. A. P.
" " " et Pot. Brom. Comp. ..... Scoville.
(Headache Powders.)
61. " Aperiens. (Saline Aperient) ..... Eberle.
62. " Caseini Comp. (Emulsifier) ..... Eberle.
63. " Lithiæ et Caffeinæ. Effervesc. ..... Eberle.
64. " Sennæ Comp. ..... Eberle.
(To replace Proprietary Liver Powder.)
65. Sodii Phosphas Liquefactus ..... No. 21, A. P.
66. Suppositoria Boroglycerini ..... Scoville.
67. " Gelatinæ ..... Diehl.
(References: Proceedings 1896, p. 443; 1898, p. 723–4; 1899, p. 457.)
68. Syrupus Bromidorum ..... Eberle, No. 22, A. P.
69. Syrupus Cinchoninæ (or Quinidinæ) ..... Eberle.
(To replace Febriline.)
70. " Ferri Albuminatis ..... No. 23, A. P.
71. " " Chloridi ..... No. 24, A. P.
72. " Glycyrrhizini Ammoniati ..... No. 25, A. P.
73. " Glycyrrhizæ et Eriodictyi ..... No. 26, A. P.
74. " Hypophosphitum Ferratus ..... Scoville.
75. " Pectoralis Compositus ..... No. 27, A. P.
76. " Pini Strobi c. Pice ..... Eberle.
77. " Pruni Virg. c. Codeina ..... Eberle.
78. " Quininæ Mur. Comp. ..... Eberle.
80. " Quininæ Phosphomur. Comp. ..... No. 28, A. P.
81. " Trifolii Comp. ..... Eberle No, 29, A. P.
82. Tablettæ Salis Vichyani Factitii Effervescentes cum Lithio ..... No. 30, A. P.
83. Thymol, Iodide ..... No. 31, A. P.
84. Tinctura Chionanthi ..... Eberle.
85. " Ferri Chloridi Toluenata ..... No. 32, A. P.
86. " " " c. Menthol ..... No. 33, A. P.
87. " Smilax Pseudo-china Comp. ..... Eberle.
(Bamboo Briar Comp. to replace Succ. Alterans.)
88. " Viburni Opuli Comp. ..... No. 34, A. P.
(This differs in some essentials from Form. No. 427 N. F. of the same title.)
89. Unguenta, to replace Unguentin and Resinol ..... Eberle.
90. Unguentum Acetanilidi Comp. ..... Scoville.
91. " Adipis Lanæ c. Pino. ..... No. 35, A. P.
92. " Hydr. Ox. Flav. Melioratum ..... No. 36, A. P.
93. Vinum Ananas et Pepsini ..... Eberle.
(Pineapple and Pepsin.)

94. Vinum Gaduoli.....Eberle.
(Wine of Cod Liver Oil and various combinations.)
95. " Hypophosphitum Comp. .....No. 37, A. P

EXHIBIT B.

References to Criticisms and Formulas in Proceedings from 1890 to 1900 inclusive.

Elixirs, Criticisms 1899, 416
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" Acetanilid 1890, 447
" Acid Salicyl. Comp.....1896, 406
" Adjuvans 1897, 411
" Ammon Valer 1893, 416
" Bromides 1896, 406
" Calisaya and Coca 1894, 562; 1895, 558
" Cathartic Comp. 1897, 411
" Chloral hydrate Comp.....1896, 406
" Cinchona 1892, 428; 1896, 407
" Ergot, ferrated 1897, 411
" Eriodictyi.....1892, 431
" Ferri et Arsen. Amar.....1898, 672
" Ferri Phos., Quin. et Strychn. 1892, 429; 1893, 415; 1895, 559; 1898, 670; 1890, 313
" Ferri Pyroph., Quin. et Strychn.....1892, 429; 1894, 563
" Ferri, Quin. et Strychn. 1900, 448
" Glonoini.....1900, 448
" Glycyrrhizæ 1892, 429
" Iodini.....1893, 415
" Iodini Comp.....1892, 429
" Kola 1896, 408
" Kola, Arom.....1895, 558; 1897, 411
" Papainæ 1894, 562
" Paraldehyde..... .....1893, 488
" Pepsin 1897, 411
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" Pepsin, Bism. and Strychn. 1895, 560; 1898, 670
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" Terpin Hydrate and Codeine 1898, 672; 1900, 448
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" Balsam of Tolu.....1890, 348
" Bromoform 1896, 411
" Cod Liver Oil.....1890, 346; 1896, 410–411; 1897, 412; 1900, 453–455
" Cod Liver Oil, Casein 1900, 454
" Cod Liver Oil, Egg 1900, 453
" Cod Liver Oil, Irish Moss 1900, 453

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" Cod Liver Oil with Hypophos....1895, 561; 1900, 455
" Cod Liver Oil with Hypophos. and Pancreatin....1895, 562
" Cod Liver Oil with Lactophosphates....1900, 455
" Iodoform....1894, 563; 1897, 412
" Oil of Gaultheria....1900, 455
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" Salol....1890, 348
" Salol and Camphor....1894, 781
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" Pepsin....1891, 308: 1894, 611
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" Hydrastis....1896, 422
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" Ferri Brom....1890, 334
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" Glycyrrhizæ....1897, 426; 1900, 474
Liquor Acid, Boric....1900, 479
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" Acid, Picric....1890, 343
" Alumini Acet....1898, 699; 1899, 442
" Ammon. Benzoate....1900, 478
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" " Alkalinus....1900, 479
" Auri et Arsen. Brom....1897, 432
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" Bismuthi....1900, 483
" " et Pepsini....1893, 393
" Boracis Co. (Brown's Drops)....1898, 699
" Boro-Salicylatus (Thiersch's Sol.)....1898, 699
" Chloralis Bromatus....1900, 478
" Colchici Comp....1900, 478
" Cresoli Saponat....1899, 444
" Extr. Glycyrrhizæ....1890, 372
" Ferri Album....1892, 466; 1895, 584; 1899, 442
" " " "Drees"....1900, 485
" Ferri Dialysati....1892, 466
" Ferri et Mang. Pept....1891, 307; 1894, 580; 1898, 699
" " " Sacch....1891, 308; 1894, 580; 1898, 699
" Ferri Pepton....1892, 467; 1894, 580; 1898, 699
" Ferri Salicyl....1891, 304; 1893, 427
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" Magnes. Carb. 1893, 429
" Morphine Bi-Mecon. 1892, 200
" Pepsin Comp. 1898, 699
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" Sodium Carbol. 1890, 342
" Sodium Phosphate. 1900, 480
" Strontium Brom. 1900, 480
" Zinci et Acidi Borici (Carter's Solution) 1898, 699
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" Calc. Glycerophosph 1900, 488
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Coming now to actual work done by the different sub-committees, it is somewhat difficult to classify, since the observations of the different members encroach, often unavoidably, on the ground of the one or the other. In the following the reports made to me—and I have at this date heard from all the members, with a single exception—are given as closely as possible to the original, eliminating only portions that are irrelevant to the subject immediately discussed. Under date of January 29, 1901.

Professor A. B. Stevens, as Chairman of the Sub-Committee on Correction of Formulas, issued a circular letter in which, calling attention to my own of January 12th, he has the following to say:

In order that the work may progress as rapidly as possible and that we may have something to report to the General Committee, I will request the members to report upon the elixirs first, then upon solutions and emulsions, and third, upon the remainder of the references. Some of the preparations may change on standing and require an additional report.

In referring to the different formulas in the Formulary it will be sufficient to refer by number without giving the name. In some cases it may be necessary to copy the formula. As all of the Committee are members of the A. Ph. A. and have the Proceedings, it will be only necessary to refer to it by volume and page. In case a reference is in a periodical I will give the reference only, but should any member be unable to refer to a copy I will copy the formula or abstract the article as the case may require.

The following is a list of criticisms brought to my notice so far. I trust that each member of the Committee will keep a close look-out for criticisms, and should any be observed, report them to me and I will send them to the other members.

List of Criticisms.

No. 31. A. Ph. A., Vol. 45, p. 411.
No. 35. " " 41, p. 416.
No. 45. " " 45, p. 411.
No. 47. " " 42, p. 581.
No. 87. " " 41, p. 488.
No. 89. " " 43, p. 560.
No. 89. " " 46, p. 670.
No. 90. " " 39, p. 284.
No. 101. " " 39, p. 284.
No. 103. " " 40, p. 430.
No. 126. A. Ph. A., Vol. 48, p. 455.
No. 128. " " 48, p. 433.
No. 129. " " 48, p. 455.
No. 132. " " 48, p. 455.
No. 211. " " 45, p. 432.
No. 212. " " 48, p. 483.
No. 218. " " 38, p. 372.
No. 234. " " 46, p. 698.
No. 250. " " 38, p. 377.

George Gundrum recommends using 2 Cc. of dilute hypophosphorus acid, in place of the 2 Gm. of citric acid, in No. 378. This change might also apply to 360 and 361. See Western Drug., 1900, 385; Phar. Review, 1900, 409.

No. 400. See Am. Jour. Pharmacy, 1900, p. 571. Also Drug. Circular, 1899, pp. 89, 138, 154, and 1900, p. 167.

No. 407. *F. W. E. Stedem* recommends omitting the alcohol. If this is done the name would doubtless have to be changed, as the "tincture" would be a misnomer.

No. 207. See Proc. 1899, 442, and 1898, 699. The last is a very weak solution of aluminum acetate with a large excess of lead acetate.

No. 69. Elixir phos. iron, quinine and strychnine. See A. Ph. A., 1898, p. 670. A number of other references might be given, but I select the one given, because it seems to be the most desirable, but this darkens quickly when exposed to light. What is desired is an elixir that will mix with water and that will not darken easily by light.

Is it best to change the formulas for emulsions of cod-liver oil or to add others? See Proc., 1895, p. 561, and 1899, p. 418; also 1900, 454. The formula given by DeForest gives good results.

Again, on Aug. 24, 1901, *Prof. Stevens* reports good progress, but not sufficiently advanced to make a report in time for the annual meeting. He has gone through much of the literature that has appeared since the revised edition of the Formulary was published, and when a formula was criticised or an improvement suggested, has given it a trial, in many instances, for the purpose of comparison. But much remains to be done, and in this he requires the aid of his co-laborers, who should make the same experiments so that the results may be compared.

Mr. F. W. E. Stedem, on Aug. 14, 1901, reports that he is engaged in carrying out a number of experiments in conformity with the work outlined by Prof. Stevens in his circular letter quoted.

Mr. E. G. Eberle, who has done some good preliminary work, as recorded in "Exhibit A," and several other members of the auxiliary committee are engaged in work on their own account, no specific work having as yet been assigned to them, but every member heard from has given cordial assurance to promptly respond to the demands that may be made on them.

Mr. Henry P. Hynson has made the following systematic report:

FOR COMMITTEE ON NATIONAL FORMULARY.

In regard to "Correction of Formulas" as a member of the sub-committee, I wish to suggest the following, relating to formulas now in the publication.

No. 23. Change directions to read: "Powder camphor, with chloroform, in one mortar and the chloral in another. Mix powders and triturate until a clear liquid results." A great saving of time!

No. 43. In *all formulas* where citric acid is used with calcium hypophosphite, substitute sufficient hypophosphorous acid; the latter will decompose any calcium carbonate that may be present, will prevent its formation and converts or reconverts it into hypophosphite. Citric acid is liable to form the sparingly soluble calcium citrate. Too much hypophosphorous acid reduces iron "citro-hypophosphite" until it loses its attractive color; this, however, is not the case when a barely sufficient quantity is used.

No. 47. I regard such a formula as unnecessary and one that will lead unthinking physicians and pharmacists into trouble. I suggest something like 98 for both 47 and 48, and offer, with sample, my own formula H. P. H. No. 1 for consideration. This answers for "all sorts and kinds" of elixirs of calisaya. I regard an elixir of the bark as no more desirable and full of objections.

No. 89. Substitute Caspari's formula and add formula for glycerite of bismuth and sodium tartrate, Caspari. Such changes offer a permanent sodium compound to re-

place the non-stable ammonium combination of bismuth. The glycerite, although requiring care and skill to prepare, keeps well and needs to be made infrequently. When used in combination with pepsin care must be taken to see that the latter does not contain the very large amount of mineral acid present in a greater number of marketed pepsins. I offer a sample of 89 made by Caspari's formula; notice acidity and presence of full amount of bismuth. Remarks about 89 refer with equal force to 90.

No. 97. This is usually colored red in this locality; although some difficulty is experienced in maintaining a uniform shade. *Neutral* solution of carmine, made by dissolving carmine in ammonia water and subjecting solution to sufficient exposure to rid it of free ammonia, stands best and longest.

No. 135. Substitute for this, Caspari's formula, at least the one in his "Treatise," for glycerite of bismuth and sodium tartrate.

No. 231. Sufficient of some harmless antiseptic should be stipulated. Carbolic acid and salicylic acid are popular in Baltimore, or were when this solution was more largely used.

No. 235. Substitute "Florence flask lightly stoppered with absorbent cotton" for "stoppered vial" in directions. Latter dangerous!

No. 264. Substitute mucilage of acacia for mucilage of dextrin, which is so seldom kept and little used. This applies when but little of the mixture is used, as with us.

No. 378. Sodium citrate is much cheaper and just as desirable as the potassium salt. Less of either should be used. 3.75 is quite enough. An excess tends to form insoluble calcium citrate, which is often the precipitate found in these syrups. Refer to note upon No. 43 regarding citric acid.

No. 386. Needs modifying. It is not as pleasant as that made by the majority of the larger manufacturers.

No. 395. This is a very long and tedious process. May suggest modification next year.

No. 407. Far too much sodium citrate used. Will experiment.

No. 445. The large quantity of salt present in all beef extracts should be precipitated with strong alcohol and the wine should be detannated. I submit formula and sample for consideration. Port wine is more nutritious than sherry.

No. 450. Why not make fresh, as required, from a glycerin solution of pepsin?

Regarding the adoption of suggested formulas from the Cincinnati Academy of Pharmacy, I have to say that I am positive that something like 11, 13, 14 and 21 should be added, and submit a formula for antiseptic solution, not my own, with sample.

About 8, 25, 29 and 34 I am in doubt, but, so far as my experience goes, none of the many others make preparations which are either needed or desirable.

While I understand the general scheme of the formulas, to one who manufactures in quantities this form is badly suited. It is far easier and saves much time, for instance, in making five gallons of elixir gentian with tincture of iron chloride, to have the formula complete, rather than to make aromatic elixir, then elixir gentian, and finally elixir gentian with tincture of iron chloride; for a pint the present plan does very well, for you are likely to have enough of each preparation on hand; but for larger quantities you would rarely be prepared to meet the requirements, consequently your formula for the larger quantity has to be made up.

Elixir of Cinchona.	H. P. H., No. 1.
Quinine sulphate	1.75 Gm.
Cinchonine sulphate	1.75 Gm.
Alcohol	280.00 Cc.
Oil of anise	0.10 Cc.
Comp. tincture of cardamom detannated	90.00 Cc.
Tincture of cudbear	38.00 Cc.
Simple syrup	300.00 Cc.
Water, a sufficient quantity.	
Make	1000.00 Cc.

Dissolve alkaloidal salts in the alcohol by aid of heat. Mix the alkaloidal solution with the compound tincture cardamom, to which the oil has been added, then with the tincture cudbear, simple syrup and, finally, enough water to make one thousand cubic centimeters. Filter.

Antiseptic Solution.	H. P. H., No. 2.
Benzoic acid	8.25 Gm.
Sodium borate	8.25 Gm.
Boric acid	16.50 Gm.
Thymol	2.50 Gm.
Alcohol	180.00 Cc.
Eucalyptol	1.50 Cc.
Oil of spearmint	.25 Cc.
Precipitated calcium phosphate	10.00 Gm.
Menthol	.75 Gm.
Oil of wintergreen	1.50 Cc.
Caramel,	
Water, of each a sufficient quantity.	
Make	1000.00 Cc.

Dissolve benzoic acid, thymol, eucalyptol, oil of wintergreen, oil of spearmint and menthol in the alcohol and mix with the precipitated calcium phosphate. Dissolve sodium borate in four hundred (400) cubic centimeters of water. Mix together the alcoholic mixture and aqueous solution and enough water to make 1000 cubic centimeters and filter. Color with caramel, light yellowish brown.

Compound Syrup of Hypophosphites.	H. P. H. No. 3.
Calcium hypophosphite	17.5 Gm.
Potassium hypophosphite	17.5 Gm.
Sodium hypophosphite	17.5 Gm.
Iron hypophosphite	2.25 Gm.
Manganese hypophosphite	2.25 Gm.
Quinine hypophosphite	2.25 Gm.
Strychnine	0.275 Gm.
Hypophosphorous acid, dilute	2.00 Cc.
Sodium citrate	3.75 Gm.
Sugar	800. Gm.
Water, sufficient.	
Make	1000. Cc.

Rub the hypophosphites of iron and of manganese with the sodium citrate, add sixty (60) cubic centimeters of water and warm the mixture until a clear greenish solution is obtained. Dissolve the strychnine, then the hypophosphites of quinine, calcium, sodium and potassium in 400 Cc. water, to which the hypophosphorous acid has been previously added. Mix the two solutions and filter. Dissolve sugar in filtrate and add sufficient water to make 1000 Cc.

Syr. Hypophos. Comp. N. F. Modified. H. P. H. No. 4.

In the formula for the above syrup, ferrous hypophos. is substituted for the ferric salt and strychnia for the tincture nux vomica; a clear, light-colored syrup will be the result, viz.:

Calcium hypophosphite	35.0 Gm.
Potassium hypophosphite	17.5 Gm.
Sodium hypophosphite	17.5 Gm.
Manganese hypophosphite	2.25 Gm.
Ferrous hypophosphite	4.50 Gm.
Quinine hypophosphite	1.125 Gm.
Strychnine hypophosphite	0.275 Gm.
Hypophosphorous acid, dilute	2.00 Cc.
Sugar	800.0 Gm.
Water, distilled, a sufficient quantity to make	1000.0 Cc.

Prepare the ferrous hypophosphite by dissolving 6.72 Gm. of ferrous sulphate (cryst.)

in 15 Cc. water, and 4.10 Gm. of calcium hypophos. in 25 Cc. water, mix the two solutions and when reaction is complete filter and wash ppt. The filtrate will contain the ferrous hypophos. in solution. Dissolve the calcium, potassium, sodium and manganese hypophosphites in 400.0 Cc. of water, to which has been added the hypophosphorous acid, add the sol. of ferrous hypophos. and sugar, agitate till latter is dissolved, then strain and add sufficient water to make 1000.0 Cc.

Beef, Wine and Iron. H. P. H. No. 5.

Extract beef	280.0 Gm.
Tinct. iron citro-chloride	280.0 Cc.
Hot water	480.0 Cc.
Alcohol	1000.0 Cc.
Syrup	1000.0 Cc.
Compound spirit of orange	8.0 Cc.
Port wine, detannated, sufficient to make	8000.0 Cc.

Rub beef extract with hot water, add alcohol and allow to stand three days, or until all sodium chloride has been precipitated, then filter and distil off alcohol. Add to residue 6000 Cc of the wine, to which the compound spirit of orange has previously been added. Finally add tincture iron citro-chloride, syrup, and enough wine to make 8000 Cc.

Prof. C. S. N. Hallberg, Chairman of the Sub-Committee on Additions to Formulary, has not had the opportunity to recommend any addition in particular, but offers the following suggestions under date of Aug. 28, 1901:

Without extending the scope of the National Formulary, a number of preparations largely used by the foreign population in certain sections of the country may be added, namely, certain antiseptic solutions (Amykos Aseptin), lotions and "balsams."

The Newer Dermatology advanced by Unna and Dietrich introduces annually a great many preparations from which a few representative types of each class may also be added, for example:

Pastes of Zinc Oxide and Petrolatum.

Pencils: a saccharine Vehicle, medicated.

Glycero-Gelatins, Salve Mulls.

Also antiseptic agents, such as:

Catgut, and antiseptic material.

Mr. E. G. Raeuber, of the same Committee, reports the following additions and corrections of formulas under date of September 2, 1901:

Syrupus Hypophosphitum Compositus. No. 378.

This formula has given a good deal of trouble; would recommend the following formula, which also will not be so liable to form fungous growth in the syrup:

℞ Calcium Hypophosphite	35.0	Gm.
Potassium Hypophosphite	17.5	Gm.
Sodium Hypophosphite	17.5	Gm.
Manganese Hypophosphite	2.25	Gm.
Solution of Hypophosphite of Iron (219 N. F.)	13.50	Cc.
Citric Acid	1.0	Gm.
Quinine Hydrochlorate	1.125	Gm.
Strychnine Sulphate	0.135	Gm.
Glycerin	100.0	Cc.
Sugar	750.0	Cc.
Water ..... sufficient to make	1000.0	Cc.

Rub the Manganese Hypophosphite with the Citric Acid to powder, add 60.0 Cc. of

water and warm the mixture a few minutes until solution is effected, add to this solution the Quinine Hydrochlorate and the Strychnine Sulphate which has been previously dissolved in a little water in a test tube by means of heat. Introduce the other Hypophosphites into a graduated bottle, add 300 Cc. water, the solution of Manganese, Quinine and Strychnine first prepared, then add the solution of Iron Hypophosphite, introduce the Sugar, and lastly enough Water to make up the volume, as soon as the sugar is saturated by the liquid, to 1000 Cc. Agitate until solution has been effected and strain.

Each fluidrachm contains calcium hypophosphite, 2 grs., potassium hypophosphite, 1 gr., sodium hypophosphite, 1 gr., manganese hypophosphite, $\frac{1}{8}$ gr., iron hypophosphite, $\frac{1}{8}$ gr., quinine hypophosphite, $\frac{1}{16}$ gr., strychnine hypophosphite, $\frac{1}{128}$ gr.

Elixir Saw Palmetto and Sandal-wood Comp.

Fluid extract Saw Palmetto berries	120 Cc.
Fluid extract sandal-wood	60 Cc.
Fluid extract corn silk	180 Cc.
Comp. spirit of orange, U. S.	4 Cc.
Syrup	120 Cc.
Alcohol	120 Cc.
Water	q. s. ad. 1000 Cc.
Purified talcum	60 Gm.

Mix the comp. spirit of orange with the alcohol, add the fluid extracts, syrup and enough water to measure 1000 Cc. Incorporate the talcum and filter through paper, returning the first portions until it runs through clear.

Each fluid dram represents fluid extract saw palmetto, 7½ minims; fluid extract sandal-wood, 3¾ minims; fluid extract corn silk, 11 minims.

Elix. Digestivum Comp. No. 59, N. F.

Formula as now contains too much acid. Reduce same, and also mode of mixing ingredients. I would recommend the following formula, viz.:

℞	Pepsin (U. S. P.)	10. Gm.
	Pancreatin (U. S. P.)	1. Gm.
	Diastase	1. Gm.
	Lactic acid	0.5 Gm.
	Hydrochloric acid	1.0 Gm.
	Glycerin	250. Cc.
	Water	125. Cc.
	Tincture cudbear	15. Cc.
	Purified talcum	15. Gm.
	Aromatic elixir (U. S. P.)	sufficient to make 1000. Cc.

Mix the acids with the glycerin and water, add the pepsin, and stir with glass rod until dissolved, triturate the pancreatin, diastase and purified talcum in a mortar, and add to this mixture the first solution by gradual addition. Triturate until a smooth mixture is obtained, then add the tincture cudbear and enough aromatic elixir to make 1000 Cc. Filter.

Syrupus Ipecacuanhæ et Opii. No. 379, N. F.

Would suggest employment of water instead of cinnamon water.

Syrupus Pini Strobi Compositus cum Pice.

This is made in the same manner, using same ingredients and quantities as in No. 386, N. F., except with the addition of oil of tar. After obtaining the 500 Cc. of percolate weigh out 7.5 Gm. of oil of tar, rub it up in a mortar with 30.0 Gm. purified talcum until

a uniform mixture is obtained; now add gradually the percolate first obtained, then filter through a wetted filter, returning the first portions of the filtrate until it runs through clear; lastly add enough of a mixture of one volume of alcohol and three volumes of water until 500 Cc. of liquid are obtained, in which dissolve the sugar and the morphine sulphate; lastly add chloroform and sufficient syrup to make 1000 Cc.

Syrupus Quininæ Phospho-muriatis Comp.

Liquor acidi phosphorici comp., N. F., 206	500.	Cc.
Quininæ hydrochloras	2.18	Gm.
Strychninæ sulphas	.136	Gm.
Spiritus amygdalæ amaræ, U. S. P.	.65	Cc.
Sugar	600.	Gm.
Caramel	2.00	Cc.
Water	sufficient to make 1000	Cc.

Dissolve the quinine in the sol. of acid phosphates, add the strychnine previously dissolved in 10 Cc. of hot water, place solution in graduated bottle, add the sugar, spts. amygdalæ amaræ and caramel, and enough water to measure 1000 Cc. Agitate until dissolved. Strain.

Each fluid drachm contains quinine hydrochlorate, $\frac{1}{8}$ gr.; strychnine sulphate, $\frac{1}{128}$ gr.

Essence of Pepsin.

Pepsin, U. S. P.	15.00	Gm.
Hydrochloric acid	2.50	Cc.
Alcohol	120.00	Cc.
Glycerin	120.00	Cc.
Syrup	120.00	Cc.
Muscatel wine	60.00	Cc.
Water	sufficient to make 1000.00	Cc.

Mix the acid with 200 Cc. of water and the glycerine, add the pepsin to this mixture, and macerate with occasional shaking until solution is effected. Then add the syrup, wine and alcohol, and lastly, enough water to make 1000 Cc. Filter.

Each fluid drachm contains about 1 gr. pepsin.

Under date of August 9th, Mr. Raeuber calls attention to the fact that he has succeeded in interesting physicians in the preparations of the National Formulary by systematically calling their attention to such that correspond to the proprietaries prescribed by them, but that he is frequently compelled to modify the National Formulary formula in order to meet the demand thus occasioned.

Mr. Louis Emanuel under dates of Aug. 10th and 11th, 1901, suggests the following formulas for admission:

1. *Ungt. Resorcin Comp.:* Zinc oxide, ℥iii; resorcin, ℥i (dissolved in water ℥ss); ichthyol, ℥ss; eucalyptol, juniper tar, of each, gtt. x; hydrous wool fat, ℥ii; petrolatum, ℥iii.

This is intended to replace the trade-named preparation called "Resinol."

2. *Humanizing Milk Powder:* Pancreatin, U. S. P., grs. xl; sodium bicarbonate, grs. cxxviii; sugar of milk, ℥xiii. Mix.

Suggested as a peptonizing powder for milk and other foods for infants, invalids and convalescents.

3. *Humanized Milk:* Humanizing milk powder, grs. c; water, ℥ii; milk, ℥ii; cream, ℥ss. Mix in a bottle, immerse in water heated to 100° F. for 15 minutes, then pour into a vessel in which quickly bring to boil, when the milk will be well peptonized and the pancreatin rendered sterile.

Mr. Emanuel also suggests the following improved formula for

4. *Mistura Chlorali et Potassii Bromidi Comp. N. F.*, for which he proposes a short synonym, such as "*Hyoscymol*" or "*Nevinol*" (Nervinol?): Chloral, 250 Gm.; Pot. Brom., 250 Gm.; Ext. Cannab. Ind., 2 Gm.; Ext. Hyoscyam., 2 Gm.: Saccharin, 1 Gm.; Glycerin, 125 Cc.; F. Ext. Licorice, 125 Cc.; Tinct. Quillaja, 125 Cc.; water, enough to make 1000 Cc. Rub the extracts with 10 Gm. of the chloral until thoroughly disintegrated, add the balance of the chloral, and then consecutively and gradually the fluid extract, the tincture, and the glycerin, stirring until dissolved. Dissolve the bromide in 600 Cc. of water, mix the two solutions, add water to make 1000 Cc. and then add the saccharin.

The alcohol at present prescribed is omitted. The resultant preparation does not separate any more of the extract of cannabis than does the N. F. preparation, and the presence of alcohol is of doubtful advantage.

Prof. Wilbur L. Scoville, Chairman of the Sub-Committee on Construction of Formulas, observes under date of Aug. 13, 1901, that he cannot advise the members of his sub-committee until the preparations that are to go into the new revised edition of the Formulary are decided on. He has done some work quietly, on his own account, on a number of preparations that should enter either the U. S. P. or the N. F., and gives formulas for "Antiseptic Solution" and "Glycerinated Tonic Elixir" which are reproduced below. He mentions also that he has about solved the problems of "Pepto-Manganese," "Creolin," "Fellows Syrup," and "Improved Syrup of Licorice," to his satisfaction.

1. *Antiseptic Solution:* Thymol, 1.0 Gm.; oil of eucalyptus odorata, 2.0 Cc.; oil of gaultheria, 0.75 Cc.; oil of peppermint, 0.20 Cc.; *Natural* benzoic acid, 8.0 Gm.; fluid extract of baptisia, 8.0 Cc.; boric acid, 24.0 Gm.; alcohol, 375.0 Cc.; water, 675.0 Cc.; talcum, 20 Gm. Dissolve the thymol, oils, benzoic acid and fluid extract in the alcohol and add the talcum. Dissolve the boric acid in the water, previously heated, and add to the alcoholic liquid and shake occasionally during seven days or longer (the longer the better), then filter. The real secret (?) of the above formula lies in the variety of eucalyptus employed and the character of the benzoic acid. The natural sublimed acid is not only softer in odor and flavor but it is also more soluble in water, while the odor of the oil of eucalyptus odorata is much sweeter and pleasanter than that directed in similar formulas.

2. *Glycerinated Tonic Elixir:* Gentian root, ground, 20 Gm.; taraxacum root, ground, 30 Gm.; sugar, 150 Gm.; spirit of orange, U. S. P., 10 Cc.; tinct. cardamom comp., 60 Cc.; solution of saccharin, N. F., 20 Cc.; phosphoric acid (85 per cent.), 5 Cc.; acetic ether, 2.5 Cc.; glycerin, 400 Cc.; sherry wine, q. s. to make 1000 Cc. Moisten the drugs with the spirit of orange and about 10 Cc. of wine and pack in a small percolator. Pour on wine to cover the drugs and when the liquid begins to drop close the lower orifice of the percolator and allow to macerate 24 hours. Then allow to drop slowly, regulating the flow to about one drop in five or six seconds, and pass enough sherry wine through the drugs to obtain about 400 Cc. of percolate. In this dissolve the sugar and filter if necessary. Then add the other ingredients in order, and finally enough sherry wine to make a total of 1000 Cc.

Reports from State Pharmaceutical Associations.

By resolution at the meeting of the *Missouri Pharmaceutical Association*, 1899, the report of the Committee on National Formulary of that Association was referred to this Committee. This report embodies the following recommendations, which are here given in brief abstract:

1. *Elixir of Potassium Bromide.* A return to the original formula, so as to read "Elixir Adjuvans" in place of Aromatic Elixir.

2. *Mixture of Chloral and Potassium Bromide.* Advocate a reduction to half the

present strength, retaining the present formula otherwise, but adding an equal volume of "Adjuvant Elixir" and a little caramel to color (vide Proc. Mo. Phar. Assoc., 1898, 116). It is claimed that this diluted mixture has the appearance, taste, and *the full* medicinal activity of the trade-named product it is intended to replace.

3. *Aromatic Syrup of Licorice* (also prescribed as Compound Syrup of Licorice). In the absence of a recognized formula, that given in Proc Mo. Pharm. Association, 1895–6, 62, is recommended for adoption in the National Formulary.

4. *Syrup of Red Poppy, B. P.*, is recommended as an addition to the National Formulary prepared according to the following formula:

Red Poppy Petals	250
Sugar	1025
Alcohol	75
Water	750

Add the petals gradually to the water heated in a water-bath, frequently stirring, and after removing the vessel infuse for twelve hours, press out the liquor, adding enough water to obtain 700 Cc.; strain, add sugar and dissolve by aid of heat; when nearly cold add the alcohol and enough water, if necessary, to make 1800 Gm.

5. *Improved Syrup of Yerba Santa, Aromatic.* The liquor potassæ in the present formula is objectionable. The improved formula, suggested by Mr. Ambrose Mueller in Proc. Mo. Pharm. Assoc., 1895–6, is recommended in place of that now in the N. F.

6. *Permanent Syrup of Ipecac.* This is obtained by the following formula:

Fluid extract of ipecac	17.50 Cc.
Sugar	250.00 Gm.
Water, enough to make	250.00 Cc.

Mix the fluid extract with 100 Cc. of water, shake well and filter. Place the sugar in a glass percolator and pour on the filtrate, adding enough water through the filter to make 250 Cc.

7. *Solution of Phenol and Camphor.* The following formula is recommended:

Camphor	390.00
Carbolic acid, C. P	140.00
Alcohol	62.50
Eucalyptol	8.00

Make a solution.

Although the report of the Committee on National Formulary of the Missouri Pharmaceutical Association, made to that body in 1898, has not been officially brought to the notice of this committee, the recommendation made in that report may, in brevity, find place here. In the following only the formulas showing the composition of the preparation recommended for introduction into the N. F. are given.

8. *Liquor Antisepticus:*

Boric acid	192	grains.
Benzoic acid	80	grains.
Borax	112	grains.
Thymol	30	grains.
Oil of eucalyptus	6	drops.
Oil of wintergreen	5	drops.
Oil of peppermint	4	drops.
Oil of thyme	3	drops.
Oil of cassia	2	drops.
Alcohol	4½	fl. oz.
Distilled water, sufficient to make	1	pint.
Caramel	1	drop or q. s.
Purified talcum	2	drachms.

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9. *Elixir Phosphori Compositum:*

Spirit of phosphorus, U. S. P.	144 minims.
Glycerin	½ fl. oz.
Elix. cinch., iron and strych. (N. F.), enough to make	16 fl. oz.

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10. *Elixir Pepsini, N. F., Improved:*

Pepsin, U. S. P.	128 grains.
Hydrochloric acid	32 minims.
Glycerin	2 fl. ozs.
Elix. quinine comp., N. F.	1 fl. drachm.
Comp. spirit of orange	2 fl. drachms.
Alcohol	4 fl. ozs.
Syrup	2 fl. ozs.
Water	8 fl. ozs.
Purified talcum	2 drachms.

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11. *Elixir Digestivum Comp., N. F., Improved.*

Pepsin, U. S. P.	96 grains.
Pancreatin	32 grains.
Diastase	8 grains.
Hydrochloric acid	16 minims.
Lactic acid	8 minims.
Glycerin	2 fl. ozs.
Elix. quinine comp., N. F.	2 fl. drachms.
Comp. spirit of orange	2 fl. drachms.
Alcohol	4 fl. ozs.
Syrup	2 fl. ozs.
Water	8 fl. ozs.
Purified talcum	2 drachms.

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12. *Tinctura Rhamni Purshianæ Dulcis.*

Rhamnus Purshiana	8 troy ozs.
Magnesia	½ troy oz.
Water, a sufficient quantity.	
Alcohol, a sufficient quantity.	
Glycerin	1 fl. oz.
Solution of saccharin, N. F.	1 fl. oz.
Diluted alcohol, enough to make 1 pint.	

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13. *Elixir Rhamni Purshianæ Dulcis.*

Sweet Tincture of Rhamnus Purshiana, prepared as above.
Aromatic Elixir, of each equal volume. AMBROSE MUELLER.

14. *Tasteless Syrup of Quinidine.*

Quinidine, crystals	16.6 Gm.
Mucilage of acacia	30.0 Cc.
Oil of lemon	2.6 Cc.
Solution of saccharin, N. F.	15.0 Cc.
Simple syrup, enough to make	500.0 Cc.

R. S. VITT.

15. *Liquor Ferri Peptonati cum Mangano.*

Peptonate of iron, dry, soluble	24.0 Gm.
Hot distilled water	200.0 Gm.
Simple syrup	200.0 Gm.
Solution of soda (2: 100)	100.0 Gm.
Liq. mangani glycosat (? C. L. D.)	50.0 Gm.
Distilled water	320.0 Gm.
Alcohol	100.0 Gm.
Tincture of orange	3.0 Gm.
Tincture of vanilla	1.5 Gm.
Acetic ether	0.5 Gm.
Aromatic tincture	1.5 Gm.
Water, enough to make	1000.0 Gm.

The following report of the Committee on Unofficial Formulæ of the *Ohio State Pharmaceutical Association*, was also, by resolution under date of July 17, 1901, referred to this Committee:

We recommend that the following formulas be submitted to the Committee on National Formulary of the American Pharmaceutical Association for their adoption in the National Formulary:

Essence of Pepsin.

Pepsin, scale, 1 to 3000	150 Gm.
Fresh calf's stomachs	No. 5.
Fresh orange peel, grated	100 Gm.
Stronger white wine, N. F.	6760 Cc.
Muscatel wine	250 Cc.
Syrup	1500 Cc.
Glycerin	400 Cc.
Water, a sufficient quantity to make	10000 Cc.

Dissolve the pepsin in the glycerin and an equal volume of water. Macerate the stomachs in the stronger white wine for three days, then drain through a colander. To the drained liquid add the grated orange peel, the solution of pepsin, the syrup, the Muscatel wine and the balance of the water, and filter through purified powdered pumice, adding a sufficient quantity of water through the filter to make the filtrate measure ten thousand (10,000) cubic centimeters.

Gentian Tonic.

Extract of gentian	10 Gm.
Fl. ex. of taraxacum	50 Cc.
Tincture of cinnamon	50 Cc.
Tincture of cardamom	10 Cc.
Phosphoric acid, U. S. P., '90	10 Cc.
Glycerin	400 Cc.
Sherry wine, a sufficient quantity to make	1000 Cc.

Dissolve the extract in the wine, add the other ingredients and filter.

Solution of the Hypophosphites Compound, without Sugar.

Hypophosphite of calcium	128 Gm.
Hypophosphite of sodium	32 Gm.
Hypophosphite of potassium	128 Gm.
Hypophosphite of iron	64 Gm.
Hypophosphite of manganese	32 Gm.
Hypophosphite of quinine	32 Gm.

Hypophosphite of strychnine	1 Gm.
Potassium citrate	128 Gm.
Citric acid	96 Gm.
Orange flavor	475 Cc.
Glycerin	3750 Cc.
Water, a sufficient quantity to make	15000 Cc.

Dissolve the first three ingredients in seven thousand five hundred (7,500) Cc. of water and filter. Dissolve the other solids in three thousand seven hundred and fifty (3,750) Cc. of water by the aid of a gentle heat, and follow this solution through the first filter. Add the glycerin to the filtrate and sufficient water through the filter to make 15000 Cc.

Fel Bovis Exsiccatum. Exsiccated Beef Gall.

Fresh beef gall	5000 Cc.
Magnesia	30 Gm.
Alcohol deodorized	1000 Cc.

Evaporate the beef gall on a water-bath to a syrupy consistence or about 1000 Cc. Allow to cool and dissolve in the alcohol, using more alcohol if necessary to make a thin liquid. Allow to stand in a cool place for three days and decant the clear supernatant fluid. Evaporate this alcoholic solution on a water-bath to a thick extract, incorporate the magnesia in this extract and continue the heat over the water bath until dry. Allow to cool and reduce to a fine powder. Keep in a well-closed container.

Quinine Glycyrrhizins.

Quinine sulphate	100 grains or 6.5 Gm.
Ammoniated glycyrrhizin	200 grains or 13. Gm.
Sugar	200 grains or 13. Gm.
Cocoa	500 grains or 32.5 Gm.

Mix and compress into 100 tablets. Each contains one (1) grain quinine sulphate.

Your committee also suggests that the formula of the compound syrup of the hypophosphites, N. F., be altered by substituting for the tincture of nux vomica its equivalent in strychnine, and that the process be changed to percolation of the sugar by the filtrate.

The suggestion is also offered by your committee that the peeled root of glycyrrhiza glabra be used in preparing compound powder of glycyrrhiza and compound powder of morphine, thus insuring a more uniform colored powder.

Your committee also wishes to call your attention to the preparations made from the above formulas and suggestions.

Respectfully submitted,

R. W. Miller,
E. R. Selzer,
Theo. D. Wetterstroem,
Chas. N. Nye.

In concluding I desire to thank the members of the committee for the promptness and courtesy with which they have replied to my circular letter. They have one and all agreed with the plans laid out for their work, and I have no doubt that so soon as it can be decided what shall go into the Formulary the work will be brought to a rapid conclusion, a decision which cannot be reached until the additions to and deletions from the U. S. P. become public. In the meantime it is proposed to go on with the work that is now or may come before the committee, without regard to its final disposition, well knowing that work done by this committee on preparations that will eventually be admitted into the Pharmacopœia is not lost, since it will prove useful to the Committee of Revision of the Pharmacopœia of the United States. The coming year is the time for energetic work.

As soon as practicable the Sub-committee on Admissions should decide upon the formulas suggested in this report and others that deserve consideration for admission into the Formulary. These being reported to me, they will be submitted to the Sub-committee on Construction of Formulas, who will give them a trial, construct proper working formulas for such as can be accepted without correction, and criticise those that seem to require correction. These being again reported to me, they will be submitted to the Committee on Correction of Formulas, who, after possible corrections, will report them back to me, together with corrections of each existing formula in their possession as they may find it proper to submit. All reports of the sub-committees should, of course, be made through the chairman of such, but it is not to be understood that individual members, if so inclined, should not communicate their views upon any subject whatsoever connected with this revision to the chairman of the general committee direct.

Respectfully submited, C. Lewis Diehl,
Chairman Committee National Formulary.

The Chairman called attention to the efficient and arduous work done by Mr. Diehl and suggested that the Section might show its appreciation by a vote of thanks.

Upon a motion to this effect by Caswell A. Mayo, a rising vote of thanks was tendered Mr. Diehl.

Mr. Mittelbach, a member of the Committee, more fully explained his objections to increasing the number of preparations in the Formulary; principal among them was, that it encouraged physicians to use the added formulas occasionally and, consequently, compelled pharmacists to provide for a burdensome number of preparations.

Mr. Sennewald said, that many of the titles of preparations, while strictly scientific, were entirely too long and cumbersome for practical daily use, and moved that it was the sense of the Section that titles of all preparations in the Formulary should be made as terse as possible.

The motion prevailed.

Mr. Ebert asked Chairman Diehl if the numbers used to denote formulas in the Formulary were necessary. Upon receiving a negative answer, he made a motion to the effect that it was the sense of the Section that these numbers should be omitted.

The motion was unanimously carried.

The question of re-arranging the formulas so that each one would be made complete within itself, instead of using stock preparations as now, was informally discussed by a number of the members present.

Mr. Stevens, to bring the matter up formally, moved that the Section request the Committee on National Formulary to complete the formulas and discontinue the use of stock preparations as now provided.

Mr. Diehl explained that the present arrangement not only facilitated the extemporaneous preparation of many of the compounds, and enabled pharmacists to promptly dispense them without keeping them made up, but it makes it possible for them to prepare smaller quantities more accurately than could be done if the formulas were complete, especially those containing essential oils.

While many of the larger retailers stated that complete formulas for a number of preparations would be much more convenient for them and the larger manufacturers, they were free to acknowledge that the present arrangement seemed the most desirable, when considering the convenience and interests of the greater number of pharmacists. It was suggested that those who made the National Formulary preparations in large quantities could make up the completed formulas and preserve them in one of the inter-leaved copies of the Formulary.

Mr. Scoville and others strongly opposed the motion, and finally, when put to vote, it failed to win a single supporter.

The suggestion that alternate formulas be provided was equally unpopular.

Mr. Hynson presented sample preparations made according to modifications suggested by him to the Committee on National Formulary, and included in its report. Among them was a preparation of beef, wine and iron, made from the extract from which salt had been precipitated by alcohol, and, thereby, greatly improving the flavor of this popular food tonic. The process was not original with him, and he did not know to whom the credit belonged, but he had used the method with very satisfactory results. He preferred the iron citro-chloride, and thought port wine more nutritious than sherry. He called particular attention to the sample of elixir of pepsin, bismuth and strychnine, made by Caspari's formula, which was bright and clear, while showing a decidedly acid reaction. The other preparations were elixir calisaya, flavored with detannated tincture of cardamon; a clear syrup of hypophosphites with quinine and strychnine, and the same made with ferrous hypophosphite, freshly prepared by double decomposition of ferrous sulphate and calcium hypophosphite.

Upon the question of including all formulas dropped from the Pharmacopœia in the National Formulary, the Section voted, recommending that this be done.

Chairman Diehl took occasion to say that the committee was glad to have this endorsement of its proposed action. He also stated that the new edition of the Formulary could not be issued until after the Pharmacopœia is published. The great interest taken in the discussion relating to the National Formulary, in which so many participated, evidenced the growing popularity of that part of the Association's work.

Mr. Hemm said that the action taken at the first session of the Section, relative to the significance of "aa" in prescriptions, might possibly be construed as expressing the opinion of the Association that this always meant equal quantities; and he therefore moved that the Secretary be instructed to so edit the Proceedings as to avoid the consequence of any such impression.

The motion was unanimously carried.

The Chairman announced that the Section would now proceed to elect officers for the coming year.

Mr. S. A. D. Sheppard, after referring in a complimentary manner to work the present Chairman, Mr. Hynson, had done, nominated him for re-election, and the nomination received several seconds.

Mr. Hynson then called Mr. Diehl to the chair, and, taking the floor, expressed in a feeling manner his pride and gratification because of the honor done him, and the great kindness shown him. He was deeply sensible and appreciative of it all, but disowned that so much credit was due to himself. The success of the Section was due to the fact that it presented just such matter as was profitable and interesting to the majority of retailers, and was sure that they would keep the Section alive and active, no matter who was elected Chairman. He stated that, for personal reasons, he must ask, as a favor, that his name be withdrawn. This was finally done by Mr. Sheppard.

Mr. Rapelye then nominated Mr. F. W. E. Stedem for Chairman. Mr. Stedem nominated Mr. Geo. W. Sloan for Associate. Mr. Caswell A. Mayo nominated Mr. William Kaemmerer for Secretary. No other nominations having been made, these gentlemen were regularly declared the unanimous choice of the Section and were duly installed; each making a happy little speech and pledging himself to do his very best to advance the interest of the Section.

Mr. Stedem in the chair, the following papers were ordered read by title and referred to the Publication Committee:

An Analysis of 1200 Prescriptions, by W. F. Jackman; Prescription Notes, by Fred'k T. Gordon; Testing Milk Sugar, by H. P. Hynson and H. A. B. Dunning; Laboratory Possibilities, by H. P. Hynson; Dispensing Notes, by H. P. Hynson.

On motion, the Section then adjourned.

Full text of the papers read by title.

AN ANALYSIS OF TWELVE HUNDRED PRESCRIPTIONS.

BY W. F. JACKMAN, ORONO, MAINE.

While the pharmacist's calling is dualistic—both a trade and a profession—yet the thoughtful pharmacist has long seen that he thrives best socially, ethically and financially to the extent that the professional side dominates; that wisdom lies in intensifying and perfecting his professional environment rather than in struggling against certain economic ills incident to modern commercial warfare, which seem irremediable. Hence the observed fact that the pharmacist everywhere seeks to advertise and emphasize his prescription department, himself regarding it as the real barometer of his business.

It is apparent, however, that mere counting of the prescriptions on a file, or even adding their total receipts, is not a sufficient index of their professional or financial value. With the modern introduction of, and vast increase in the products of the manufacturing pharmacists—reputable and

otherwise—and the growing specification of these products by the prescriber (though often of unknown composition) the practice of medicine, and the consequent status of the prescription counter, has vastly changed. Hence for a just estimate of this status a more careful analysis of the prescription file than formerly sufficed is now necessary.

Provisionally it may be convenient to divide prescriptions into four classes: (1) those whose ingredients are non-secret, reputable and readily dispensed from accessible, non-monopolized and non-specified sources; (2) those containing ingredients largely of specified brands, or which are otherwise restricted to certain limited or single sources, but which ingredients are non secret, reputable, and from recognized reputable sources; (3) proprietaries (except those under 4) and "fakes" generally, including —by whomsoever made—preparations whose active constituents are secret, or imperfectly or falsely stated; (4) true organic synthetics, usually real patented and trade-marked preparations. Or more briefly, (1) legitimate medicines of unspecified brands; (2) specified reputable brands (3) all secret preparations; (4) "coal-tar" remedies, so-called.

The practical druggist will note that the first class (to which formerly all prescriptions belonged) includes practically all that offer fair scope for his professional training, or a fair margin of profit for reasonable prices. In fact, professional scope and margin approach the vanishing point about in the order of the successive classes. The careful druggist, therefore, does not seek such localities as are proportionately represented by the last three classes, such preponderance indicating a saddening surplus of undesirable doctors.

Tables of such character prepared from time to time of a given locality would prove instructive; and by comparison at different dates, the rate of advance or decline in medicine and pharmacy would be surely indicated. As a tentative illustration, below is submitted an analysis of 1200 prescriptions made by the writer in May last, from the files (recent) of one of the largest dispensers of central Maine. (Name and locality at present withheld, from lack of permission at time of writing to publisher.) The prescriptions were consecutive, and counted in four sets of 500, 250, 225 and 225 respectively. It is believed that if some such prescription census were taken from time to time, covering the country generally, it would prove of great direct and incidental value; one of the remote possible benefits being that, by the emphasis of such publicity, some physicians might be shamed into prescribing more in accordance with rational therapeutics, to the much-needed relief both of the patient and dispenser.

Class.	*1st Set.*	*2d Set.*	*3d Set.*	*4th Set.*	*Average per cent.*
I.	175	98	88	84	37.1
II.	163	72	80	112	35.6
III.	150	73	52	25	25.0
IV.	12	7	5	4	2.3
	500	250	225	225	100.0

PRESCRIPTION NOTES.

BY FREDERICK T. GORDON, U. S. N.

℞ Acid salicylic ..... gr. lv.
Potass. bicarb ..... q. s.
Tinct. ferri chlor ..... ℥iii.
Aq. menth. pip. ..... q. s. ad. ℥iii.

Dissolve salicylic acid and potassium bicarbonate in 2 ounces of peppermint water, add the tincture of ferric chloride drop by drop, stirring continuously, then add peppermint water to make the 3 ounces. The crux in this prescription lies in the use of enough potassium bicarbonate to neutralize the acidity of the tincture of iron, otherwise the acid in the tincture will throw out salicylic acid.

℞ Ole. ricini ..... m. 30.
Salolis ..... grs. 5.
Make soft capsules No. 30, containing this amount each.

Dissolve the salol in the castor oil, in a flask, by gentle heat, fill capsules with a medicine dropper and seal with gelatin as usual. The salol will partially separate out on cooling of the mixture.

℞ Pulv. boracis ..... ℥ii.
Tinct. myrrhæ ..... ℥ii.
Aq. camphoræ ..... q. s. ad. ℥viii.

Dissolve borax in 2 drachms hot water, add tinct. myrrh at once and shake vigorously until a smooth mixture results; now add camphor water by small proportions, shaking after each addition. This will give a smooth milky mixture that is permanent and in which the myrrh will not separate.

℞ Adrenaline ..... ℥i.
Sat. sol. ac. boric ..... ℥i.
Sig. Take ten drops in water every three hours.

This is an example of careless or ignorant prescription writing. The prescriber wanted the "1–1000" solution of adrenaline chloride, not knowing that there was any other form than this of the drug. This prescription, if compounded as written, would have cost the patient $350.

℞ Bismuth. oxid. ..... } āā ℥i.
Bismuth. subnitrat. ..... }
Ac. oleic ..... ℥i.
Ceræ albæ ..... ℥ ¼
Lanolin ..... ℥iss.

This prescription was compounded as follows: The bismuth oxide (also known as bismuth hydrate) was dissolved by the aid of gentle heat in the oleic acid, the wax in small bits was thrown in and melted, stirring constantly. This portion was then allowed to cool until just soft, the lanolin incorporated, and then the bismuth subnitrate, making a smooth ointment in which the bismuth oleate was so combined that it would best exert its physiological effects.

TESTING MILK SUGAR.

BY H. P. HYNSON AND H. A. B. DUNNING.

FOR CANE SUGAR.

The test solution is composed of resorcin 3 parts, hydrochloric acid 1 part, alcohol 100 parts. Application: Dissolve 0.1 of the suspected milk sugar in a few drops of water contained in a porcelain dish and add to this solution 5 or 6 drops of the test solution. Evaporate slowly over a spirit lamp and allow the outer edge of solution to boil a little, then tip the dish to one side. On the surface left moist by the receding liquid continue heat gently. If a trace of cane sugar be present there will appear beautiful flashes of vermilion color over the surface treated. If there be an appreciable amount (5 to 10 per cent.) of cane sugar present, a vermilion mirror will be formed which can be more clearly seen upon carefully evaporating the entire solution. The evaporation must take place slowly as the sugars will easily char if exposed to too much heat.

A brownish red color quickly charring and not spreading must not be mistaken for cane sugar. This coloration is caused by the milk sugar but need not be confused with the vermilion coloration of cane sugar.

FOR GLUCOSE—A MODIFICATION.

In the National Dispensatory a test for the presence of glucose in milk sugar is quoted from the German Pharmacopœia, viz: "On adding 0.2 of milk sugar to a boiling mixture of 4.0 of solution of basic lead acetate and 2.0 of ammonia water a white precipitate, free from a red tint, should be produced" (absence of glucose).

If added to the boiling solution the red tint will sometimes be produced, and sometimes not in *absence* of glucose, and *always* upon further boiling. If the milk sugar be added to the *cold* mixture of lead subacetate and ammonia water, in the presence of glucose, the red color will be produced within an hour and *never* if the glucose is absent.

LABORATORY POSSIBILITIES.

SUPPLEMENTAL REPORT OF CHAIRMAN OF PRACTICAL PHARMACY AND DISPENSING SECTION A. PH. A.

Advanced medicine requires and stimulates advanced pharmacy.

There may be some question as to the justice or the advisability of the pharmacist undertaking the examination of pathological specimens; whether or not it is within the legitimate scope of his operation to assist in making diagnosis; but there can be no possible objection to his supplying the means for executing the processes by which conclusions are reached. Chemical apparatus, microscopes and microscopical accessories are profitable and creditable stock for the sales department, while the preparations of reagents, volumetric solutions, test solutions, microscopic stains, etc., can be prepared in his laboratory, with perfect consistency and profitable satisfaction.

Physiological chemistry compasses nearly all the chemical operations of the physician and, besides the reagents purchased of the larger manufacturing chemist—for the quality and strength of which the pharmacist must be responsible—there are not a great many to be made by him, yet these should help to keep his laboratory busy.

Fehling's Solution should, no doubt, be supplied in two parts, unless expressly ordered completed. The containers for these solutions and all other reagents should be glass-stoppered bottles, as these add so materially to the appearance of an outfit.

Purdy's Solution, at one time very popular, is occasionally called for, and much of Geunzberg's test for hydrochloric acid is used, as are the solutions for the diazo reactions and the principal indicators.

Although no great variety of volumetric solutions are called for, quite a quantity of deci-normal sodium hydrate solution is sold and, while these solutions require time and care for adjustment, experience in this, as in everything else, gives facility. A standard must, of course, be at hand and carefully recrystallized oxalic acid, the first time from alcohol, seems the most satisfactory; these solutions should be verified if more than a few days old.

Volumetric analysis is far less intricate than the unitiated imagine, and can be accomplished with fair accuracy by the average pharmacist, after a moderate amount of practice. Ability to use this method of estimating, opens up many interesting and profitable avenues to the retailer.

The microscope is so generally used in medicine to-day, that it is almost as necessary to be able to supply physicians' stains and accessories as it is to fill prescriptions. The variety of stains is not large, for ordinary demands, and not more than six or eight need be kept made up. Gabbett's stains, carbol fuchsin and methylene blue, Erlich's triacid stain, Jenner's gentian violet, haematoxylin-alum and Toison's dilution solution are among the more prominent; success in their preparation depends largely upon the quality of the dry colors used. Ordinary commercial aniline will not answer; Gruebler's are the best to be had and, although comparatively expensive, can be used and still a good profit secured. Formulas for all these stains, reagents and solutions may be found in almost any modern work on pathology; "Simon's Clinical Diagnosis" is the best I have ever seen and Von Kahlden is good. Some of the processes for making them seem odd and unpharmaceutical and may, in many instances, be modified to advantage. Erlich's triacid blood stain is, perhaps, the most difficult to prepare; the prescribed manipulation can be simplified by an accomplished pharmacist. Jenner's stain is simple but tedious in preparation, and is becoming very popular for blood examinations.

In additions to products used in chemical and microscopical examinations, others, just a little out of the ordinary, may be supplied. Physiologically normal salt solution may be kept on hand, sterilized in 500 Cc. and

one liter Florence flasks, respectively. Salt tablets for making this solution are also popular. Thompson's bladder irrigating fluid and Muller's preserving liquid are sold in large quantities. Loefler's Solution, used in diphtheria, is easily made and keeps well. Solution of adrenals, properly preserved, are in great demand. Mucilaginous lubricants, for surgeons, are a late requisite; Iceland moss with glycerin is most largely used, dispensed in collapsible tubes; these lubricants must be sterile and antiseptic. Green soap, in tubes, should also be sterile; before filling these, the screw of cap and neck should be coated with petrolatum and great care used to keep any of the soap off of the outside of tube; the reason for this is, no doubt, obvious.

Nebulizing solutions or liquids are more and more used and should be prepared by every active pharmacist. Formulas can be easily had from the manufacturers of the nebulizers and good judgment and pharmaceutic skill, only, are necessary to win success in their preparation.

Ability and facility in making chemical analyses and determinations are of immense advantage to the retail pharmacist, doing a sufficiently large business. It is a telling advertisement to be able to examine and report upon a questioned tablet, capsulated powder or suspected solution. It is often a protection to one's self to be able to prove that doubts regarding a prescription are unfounded. Very recent instances are remembered of being compelled to examine bismuth and sugar powders, sulfonal capsules, solution of homatropine hydrobromide, tablets of cocaine hydrochloride, tablets of iron, arsenic and strychnine. It is also often a protection in business competition. When one *proves* to a customer that a competitor is supplying tincture of ferric chloride containing but 50 per cent. of alcohol, or tincture of iodine made with wood alcohol and containing but three per cent. of iodine, he is doing a good deal to help his business interests. Quite profitable is it when a pharmacist can go into the open market and buy chemicals and assayable products at 25 per cent. to 50 per cent. below the price of standard brands, prove their purity and worth; making all the while, a reputation for himself and establishing a brand of his own.

These are a few of the possibilities of the pharmaceutic laboratory, which I believe are not generally practiced and to which may be added many more by others with larger experience.

Taken in connection with the decline in specification, they offer a large field for laboratory operations; enough, in an establishment doing an average business, to keep one person profitably employed during regular business hours.

DISPENSING NOTES.

SECOND SUPPLEMENTAL REPORT OF CHAIRMAN OF PRACTICAL PHARMACY AND DISPENSING SECTION A. PH. A.

The motive which leads me to present these notes must quickly disarm criticism, since their presentation involves no greater ambition than to be plain, common-place and helpful; to lend encouragement to those who could do much better, but persistently withhold the wealth of information and valuable experiences they could offer.

Ninety per cent. of these notes have been collected within the last year, and more than as many important occurrences have escaped record or memory. Those collected, which will be given without any effort to systematically arrange them, are as follows:

Either boric or salicylic acid can be added to a solution of cocaine hydrochloride, without causing trouble and are desirable preservatives, but, if both acids are added, a precipitate occurs. Why?

From a mixture, no matter how prepared, of quinine sulphate 2 drs., iron sulphate ½ dr., magnesium sulphate 1 troy ounce, dilute sulphuric acid 3 fld. drs., and water enough to make 3 fld. ounces, the alkaloid will be precipitated, but if hydrochloric acid be substituted for the sulphuric, a perfectly clear and permanent solution results, due, of course, to the greater solubility of quinine di-hydrochloride, the bi-sulphate not being sufficiently soluble in the strong solution of magnesium sulphate.

An attempt to make gelatin lozenges containing orthoform proved that this substance entirely overcame the gelatinizing power of the gelatin. Tragacanth and sugar base had to be used

A permanent and satisfactory solution of gelatin and salt for venal infusion may be made by dissolving 2.5 per cent. of the former in water and adding .06 per cent. of sodium chloride C. P. and sterilizing thoroughly.

The sterilization of fluids for subcutaneous medication and surgical uses, is best effected by placing the cork, *very lightly*, in the bottle, covering it with a considerable quantity of absorbent cotton, which is tied over with gauze. The bottle is then kept in boiling water or an active sterilizer for thirty minutes or longer; the heating is repeated the following day, if time is allowed, when the cork is tightly pushed in place without removing cotton or gauze.

Neither morphine nor its salts can be made to dissolve in petroleum oil; heat, chloroform or oleic acid are of no assistance.

Occasionally it happens in making pills of mercury and chalk, that the mercury separates into noticeable globules. This results from excessive kneading of the mass or poorly made grey powder.

Camel-hair pencils are frequently ordered to be fixed in the cork of

bottles containing collodion. Care should be taken that the silk used in wrapping the hair does not contain coloring matter soluble in ether, or the collodion will be greatly discolored.

Care should be taked to cleanse the bulbs of eye-droppers dispensed with eye-solution; much of the trouble with these solutions is due to the dropper. Bulbs made of pure antimony maroon rubber are the most desirable to use.

In filtering eye solutions, the best chemical paper should be used, and in addition, a small piece of long fibre absorbent cotton placed in the neck of the funnel will catch much of the fibre which is difficult to get out of the solution. The running over or out of filtering liquids, due to the non-escape of air from bottles, can be prevented by using long stem funnels, and by keeping the necks of the bottles dry.

When one receives a request from a customer, sending a recipe for a hair tonic containing small amounts of oil of lavender and rosemary, "Please put something in to hide the disagreeable odor of the oils," would it be wrong to simply omit the oils? The answer must be based upon the worth of these oils as hair restoratives, of course.

Remember that a mixture of glycothymolin and Kennedy's colorless extract of white pine, will effervesce.

Strong solutions of salts in aromatic waters have a cloudy appearance because the full amount of oil will not remain in solution. This can be avoided by using not quite all (90 per cent.) of the water prescribed and making up the quantity with distilled water. Add 5 per cent of the latter to the salt and the balance to solution after it has been strained. This strongly applies to camphor water.

For making strong solutions of quinine sulphate, hydrochloric acid, naturally, answers much better than sulphuric acid.

Lead acetate with alum or zinc sulphate makes a paste or mass which can not be dispensed as intended for making solutions. The dried salts might be used, but were objected to by the physician, and the substances were dispensed in separate packages with directions.

A good general rule for selecting suspending agents, is to use acacia for non-alcoholic liquids and tragacanth for all solids and alcoholic fluids.

Better and quicker results can be secured in the Hayden process for salol coating pills, if a few drops of alcohol are added to the pills from time to time while the smoothing is in process.

Equal quantities of calcium glycero-phosphate and the 35 per cent. aqueous sodium glycero-phosphate can be made into a mass and capsulated. The capsules will stand indefinitely.

White turpentine, softened with alcohol, makes a better ointment than when softened by heat.

Asafetida should be kneaded with water until sufficiently soft, when it is to be made in mass with powdered substances.

Saturated solutions of mercury succimide must be considerably diluted before they will hold even 2 per cent. of cocaine hydrochloride.

Bicarbonate, not carbonate of potassium, must be used for making solutions of arsenous acid, as may have been noticed by those who have prepared the Huff cure for consumption; "N. Y. Journal."

Saturated solutions of potassium iodide mix with equal quantities of comp. tincture of cinchona without precipitation; further additions of water cause precipitation.

Only one elixir of iron, quinine and strychnine, on the market, will remain clear when mixed with equal quantities of U. S. P. syrup hypophosphites; this same brand will hold large quantities of sodium sulphate in solution. It contains free hydrochloric acid. There are instances of the same prescription appearing differently when prepared in different stores.

Carbolic acid, when added to Goulard's extract, causes a heavy mass to precipitate, which can be prevented by first dissolving the carbolic acid in a little glycerin.

The mixture containing bismuth subnitrate and sodium bicarbonate is well-known and understood. When sodium carbonate, not bicarbonate, is prescribed with bismuth, the sediment becomes as hard as marble and cannot possibly be shaken into the fluid.

What is meant by a 10 per cent. solution of formaldehyde or formalin; 10 per cent. of either of these to 90 per cent. of water, or either reduced to one-fourth its normal strength?

To make a pill of extract of ergot and potassium permanganate, it has been suggested that a sugar-coated pill of the potassium salt could be used and the extract worked around it.

It may not be generally known that solutions of zinc chloride may be made clear by the addition of just sufficient hydrochloric acid to dissolve the carbonate present.

Chloretone is not soluble in petroleum oil, but when dissolved in a fixed oil, the solution will mix with the liquid petroleum in fair proportions.

Eucaine B. dissolves in solution of adrenaline hydrochloride, without objectionable pharmaceutical behavior. Adrenaline hydrochloride cannot be dissolved in petroleum oil alone or by aid of chloroform, heat or oleic acid.

These are just about half of the notes of which I wrote in opening, yet I forbear to give more. Since they are intended to be simply instructive and suggestive, I will close with two from the manufacturing department.

Most of the soluble pepsins on the market are entirely too acid to be permissible in elixirs of pepsin and bismuth, and are no doubt the cause of so many failures with these preparations. Such must be nearly neutralized, with sodium bicarbonate, before they can be used. An examination of several specimens made by three different leading manufacturers found them to contain 3, 2.2, 7.0, 7.8, 2.3, 3.8 and 1.1 per cent. respectively, of hydrochloric acid.

In making aromatic spirit of ammonia, if the solutions are made and allowed to stand about four days instead of twenty-four hours, and then, the ammonia solution added in small portions to the alcoholic solution, allowing the mixture to stand fifteen or twenty minutes after each addition, none of the usual precipitate will be formed at the time, and very little, if any, after a long standing.

In conclusion, I wish to thank Mr. H. A. B. Dunning, manager of our prescription department, and Messrs. Singer and Hanrahan, for many of these observations and for much of the work done.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION.—THURSDAY EVENING, SEPT. 19, 1901.

The Section was called to order at 8 : 15 p. m. by Chairman Oldberg.

Mr. W. A. Puckner was called to the chair while the address of the Chairman was being read :

ANNUAL ADDRESS OF THE CHAIRMAN OF THE COMMITTEE ON SCIENTIFIC PAPERS.

Gentlemen : Scientific medicine can accomplish little or nothing without the aid of scientific pharmacy. The recognition of this truth is not as pronounced and general as it might be; but, feeble as it is, it accounts for the Scientific Section of the American Pharmaceutical Association.

Signs of scientific activity in American pharmacy are by no means wanting. The American Pharmacopœia is scientific and technical to a degree which gives it high rank among the pharmacopœias of the world. None of them are perfect; but the unscientific features seen in them are being gradually eliminated.

The progress in Medicine is rapid. The progress in Pharmacy must keep pace with it. New remedies are discovered almost daily. These must be studied, analyzed, described, and means provided for their identification and examination. All of this work must be done by scientifically trained specialists—the pharmacists. The Pharmacopœia must be understood and obeyed. It can be fully understood only by pharmacists of proper scientific-technical education. We all subscribe to the principle that the training of the pharmacist must not fall below that which is necessary to an intelligent interpretation and application of the text of the Pharmacopœia, and that as the Pharmacopœia is improved, pharmacy and pharmacists must improve with it. The only truly practical pharmacist is the educated pharmacist.

If the papers read before this Section of the American Pharmaceutical Association may be taken as a reliable index of the scientific progress of American pharmacy we would have little cause for regret. But these papers do not indicate what proportion of the pharmacists of our country are actually doing their work in a scientific manner. During the past ten years 218 papers were read before the Scientific Section of this Association. Of these 218 papers, 165 came from the pharmaceutical schools, 22 from the laboratories of manufacturing pharmacists, and 31 from other sources. Not all of the 31 others were practising pharmacists.

It is quite natural that a large proportion of the scientific papers read here should come from the schools and from the laboratories of manufacturers. We have right to expect

it of them. But may we not expect more than 30 papers in ten years from the practicing pharmacists of this great and progressive country? I believe that the technica knowledge and training of the members of this Association ought to bear more abundant fruit in the Scientific Section. The Section is vitally concerned in the question of pharmaceutical education and legislation. If we do not sow the seed and diligently cultivate the ground, neither can we reap.

The most direct, simple and rational method of ascertaining whether or not a man has really prepared himself in any serious way for the responsible duties of pharmacy is to require him to state specifically what he has done in that direction. Then, if his categorical answers show that he has actually done enough to justify the hope that he may possibly know enough to be recognized as a pharmacist, give him an examination. But the Boards of Pharmacy never ask a candidate whether or not he has ever pursued any course of study, or received any instruction, or done any work along the lines upon which the examination is conducted. They do ask the candidate if he has attended or graduated from any college of pharmacy. If he answers "yes" then they feel in duty bound to punish him with a more perplexing examination; if he says "no," then they give him a milder examination; but they never refuse to examine a candidate who may be obliged to confess before-hand that he never studied chemistry, or materia medica, or pharmacy in all his life. You might think that their object is to effectually convince the young man he ought not to insult the examiners by asking for an examination upon matters about which he ought to know that he is totally ignorant; but many of these candidates pass, become registered pharmacists, and are later called upon by the energetic friends of the American Pharmaceutical Association and invited to become members of this body.

Let us think. Is it any wonder that such men refuse to join our Association? Or that they join one year and drop out the next year? Or that they do not participate actively in our work if they do become members?

At its last annual meeting the American Pharmaceutical Association, to its everlasting credit, adopted, without a dissenting vote, a draft of a "model pharmacy law," the most important feature of which was the requirement that no person should hereafter be admitted to the rank of a registered pharmacist unless he has graduated from a pharmaceutical school. Will not the Association now go one step further and fix upon some kind of an educational qualification or standard of technical training for membership? We cannot consistently do less. Let us remember that the old membership which has made this Association what it is must pass away. Let us provide for the future of our dearly beloved Association by seeing to it that its coming membership shall be such as to preserve and improve it.

The strenuous method of increasing our membership in numbers is perhaps a good thing for the new members as well as for the present needs of our treasury; but let us henceforth particularly strive to enlist into our ranks as many as possible of the men who may increase the usefulness, and influence the good name of our Association in a scientific direction.

Then will we have more than 30 papers in ten years from those of our members who are not engaged in teaching or in manufacturing.

I may not attempt any review of important discoveries during the past year in the sciences most intimately related to pharmacy. It is, in the nature of things, forbidden the Chairman of this Section. Yet, I may be pardoned for calling your attention to the possible if not probable solution of one of the mooted questions which have puzzled the student of chemistry during recent years. The gaseous elements recently discovered in the atmosphere, for which, it was said, no place could be found in the periodic system of classification, seem to fit into that system so perfectly as to add new evidence to the truth of the periodic law, for neon, argon, crypton and xenon would seem to form one

family, which belongs, as another 8th group, between the halogens and their antipodes, the alkali metals:—

Fluorine	Neon	Sodium
19	20	23
Chlorine	Argon	Potassium
35.5	39.9 (?)	39
Bromine	Crypton	Rubidium
80	82	85.5
Iodine	Xenon	Cæsium
126.5	128	133

With a due sense of the feebleness of my right and fitness to discuss questions of theoretical chemistry in a critical attitude, I ask your attention, further, to the inconsistencies of the molecular formulas and weights used in our pharmaceutical and chemical works. If we subscribe to the theory that *molecules are the smallest particles into which any particular kind of matter can be divided without losing the specific properties which determine its individuality*, we shall have little difficulty in remedying a few of the inconsistencies referred to. Avogadro's law states that equal volumes of all gases contain an equal number of molecules; but it seems to me that no one substance can have more than one kind of molecules or more than one molecular weight. I leave it to the masters of chemistry to say whether the law of Avogadro ought not to be qualified so as to read to the effect that *equal volumes of all gases contain the same number of individual particles of matter* (not necessarily "molecules").

Our Pharmacopœia assigns to ferric chloride the old formula, Fe_2Cl_6, and a corresponding molecular weight, whereas modern recognized authorities on chemistry give the formula $FeCl_3$. Particles of Fe_2Cl_6 exist in the state of vapor, and also particles of $FeCl_3$ at a higher temperature. Here the old formula is inconsistent, while the new one is consistent, with the theory of atomic linking. On the other hand our Pharmacopœia writes arsenous oxide As_2O_3, although, so far as I know, that compound has not yet been obtained in vapor of a density corresponding to that formula, but has been obtained of a vapor density corresponding to the formula As_4O_6.

May it not be profitable to adopt the rule that the molecular weight of any vaporizable compound must be twice the number indicating its *lowest* possible vapor density, and that the molecular formula must be consistent with the theory of atomic linking? This question is one of interest, as well as importance.

Thanking you for your indulgence, I hope that the sittings of the Scientific Section of the American Pharmaceutical Association at this meeting will be successful, and that our future may be even brighter than any of our past years.

The address was applauded.

MR. OLDBERG: Since we came to St Louis, I have been very much surprised to find what a large number of papers there are to be read at this meeting. At the date for sending manuscript to the printer I had not more than three papers in my hands. A few days later I had four more, and in time to be printed. I knew by correspondence of perhaps a half dozen more papers. But since we have been here in St. Louis, after repeated calls upon the contributors, I have suddenly discovered that we have thirty-two papers, a larger number than we have had for ten years past before this Section. A few days ago, when I did not know how many papers we had, I consented, under pressure, to reducing the three sessions to two. Now, we are under the necessity of disposing of all these papers in two sessions. I therefore wish to impress upon the minds of all the necessity of brevity and great economy of time. The by-laws confine each and every-

one to not more than ten minutes. I am in hopes we can cut down this ten minutes to five in many cases, and in some cases to *no* minutes. It is really absolutely necessary, We will not get through with the papers in any other way.

THE CHAIR: Gentlemen, the Chairman's address is before you for action. What will you do with it?

Mr. Stedem moved to receive and refer for publication.
The motion was seconded by Mr. Stevens, and adopted.
Mr. Oldberg resumes the chair.

THE CHAIRMAN: The next thing in order is the reports of committees. We have a committee on prize essays—the Committee on the Ebert Prize.

The report was read by Mr. Mayo as follows:

REPORT OF COMMITTEE ON EBERT PRIZE FOR THE YEAR 1901.

Your Committee have very carefully considered the various papers presented at the Richmond meeting, and while there are some which undoubtedly merit receiving the general prizes offered by the Association, we are of the opinion that no one paper is of sufficient merit to be worthy of receiving the Ebert Prize.

Yours very truly,

EDGAR L. PATCH,
W. SIMON,
FRANCIS HEMM.

On motion, the report was accepted, and referred to the Committee on Publication.

THE CHAIRMAN: Are there any other committee reports ready? If not, there is a special committee, appointed at the last meeting, on the introduction of diphtheria antitoxin into the Pharmacopœia. Is that committee ready to report? Mr. Sayre is Chairman.

MR. SAYRE: I am sorry we are cut down to such a limit. I will try to make a report within the time named. There is a paper which bears upon this very subject which I should like to have read by its author — or the substance of it given — after the report is made. The committee appointed to investigate the question of including diphtheria antitoxin into the Pharmacopœia of 1900, adopted the plan of sending a circular letter, personally addressed to those who have identified themselves with the production of this agent, and to those who would be interested in its consideration. I shall not have time to read the circular. It was sent to manufacturers of antitoxin and bacteriological and such-like products, and it seems ridiculous not to read some of the comments—the *pros* and *cons*—but I shall not have time. It simply goes to show how we are hampered in our work in this Section. I will say, though, that these replies are quite voluminous, many of them, and the substance of them is contained in this report.

Out of 41 replies received from 215 letters sent out, 24 express themselves as in favor, and 12 opposed to its introduction. But many of those who are opposed to the introduction go on to state how they think it should be introduced, if it is introduced, thus showing that their opposition is not strong. The report, also, refers to the fact that antitoxin is now introduced into the German Pharmacepœia, and the German Pharmacopœia text is here translated, showing just how it is introduced there.

REPORT OF COMMITTEE ON THE OFFICIAL RECOGNITION OF DIPHTHERIA ANTITOXIN.

Your Committee appointed to investigate the question of introducing diphtheria antitoxin into the United States Pharmacopœia of 1900–1910, after consulting as to the best method of collecting material for its report, adopted the plan of sending a circular letter personally addressed, to those who have identified themselves with the introduction and administration of this remedial agent, and to those who would likely be interested in the question under consideration. This circular letter was, in substance, as follows:

"The undersigned were appointed by the Scientific Section of the American Pharmaceutical Association to investigate the question of introducing into the United States Pharmacopœia anti-diphtheritic serum. In order to bring this properly before the Association, a circular letter to those who have especially identified themselves with the production and administration was determined upon. You will greatly oblige us by responding to this letter by expressing your opinion on the various questions submitted:

1. In your opinion is it advisable to introduce anti-diphtheritic serum into the United States Pharmacopœia? If so, what name should be employed?

2. What, in your opinion, should be the pharmaceutical description? Should it include: (a) origin, (b) physical, (c) chemical, (d) biological description?

3. Should the conditions under which the serum should be kept (stored) by the pharmacist be stated? What should be the statement in this particular?

4. Should the Pharmacopœia name the antiseptic and state its percentage employed by manufacturers for its preservation? If so, should it give a qualitative and quantitative test for this antiseptic?

5. What tests should be applied to determine whether the serum is sterile?

6. What tests should be applied for its identification?

7. What should be the details given for the determination of the antitoxin strength, and how should a unit of strength be defined?

The Committee is aware of the fact that the Pharmaceutical Convention at Washington, in its instructions to the Committee of Revision, seems to debar antitoxin, or any article requiring physiological test for standardization; but, having been appointed by the Association to investigate the subject, we have accepted the work irrespective of the limitations imposed upon the Revision Committee.

Kindly send replies to the Chairman.

Very respectfully,

L. E. Sayre, Ph. M., *Chairman*,
W. W. Houghton, M. D.,
Albert Schneider, M. D., Ph. D."

The letter was sent especially to physicians who were known to be connected more or less prominently with bacteriological work, to prominent members of Boards of Health, and to manufacturing chemists and retail pharmacists whose experience with the material would make their opinion of value. More specifically to:

"1. Manufacturers of antitoxin and biological products.

2. Bacteriologists engaged in the actual production of antitoxins and biological products.

3. Teachers of bacteriology in the universities, etc.

4. Health officers of cities containing over 100,000 population.

5. Prominent physicians, especially those devoting their entire attention to the subject of diseases of children.

6. A few prominent retail pharmacists."

On August 2nd, 1901, 215 letters were mailed. Up to September, forty replies have been received; twenty-four have expressed themselves as in favor, and twelve as opposed to the official recognition of antitoxin. Four were non-committal.

Many of the letters received in reply, pro and con, are extremely brief and express opinion in a word or two on the several questions; many of the replies in the affirmative are quite emphatic as regards question one, and may be voiced by the words of Dr. Cushney, of Ann Arbor, who says, "We cannot afford to leave out of the United States Pharmacopœia such an important remedy as antitoxin." A few express themselves as unqualified to give an opinion relating to details called for in questions two to seven, as these involve, as one says, "pharmaceutical form and technique." Dr. Wingate, Secretary Wisconsin Board of Health, says, "I think all of the facts that we know concerning the manufacture and keeping of this agent should be set forth in the Pharmacopœia in as clear and brief a manner as possible." Dr. Rosenar, formerly of the Hygienic Laboratory of Marine Hospital Service, states, "I should like to see the agent made official. I am, however, opposed to introducing the details, as the subject is too technical for consideration outside of special writings." A medium ground is taken by some who state, "While it might be well to embody in the United States Pharmacopœia descriptive information in keeping with the custom of the United States Pharmacopœia in introducing new drugs, this should serve merely as interesting information. Experts should be employed to decide on the tests relating to questions four to seven, which tests, etc., could not be practically employed by the pharmacist." Dr. Lincoln, of the University of Pennsylvania, says, "I do not think the pharmacopœia should include a physical description of antitoxin, as in the future it will probably be changed into a powder or a solution of powder in normal salt solution, just as soon as a satisfactory method of isolating the antitoxin or the globulins is found." Referring to the probable changes in the future with reference to the principle under consideration, I should refer to Dr. Woodward, Health Officer of Washington, D. C., who speaks of the standardization. He says, "This will always be liable to more or less inaccuracy on account of the impossibility of measuring the dose of diphtheria toxin with mathematical accuracy and of determining, in like manner, the susceptibility of the guinea-pig. Nevertheless a standard similar to that now in use should be provisionally adopted, to be revised or abandoned whenever it becomes apparent that chemistry will yield a more accurate gauge than bacteriology, or whenever bacteriological methods are so improved as to warrant a revision. The adoption of the standard must be as arbitrary a proceeding as was originally the adoption of the inch, the pound, or the pint, and be best left to working bacteriologists."

In regard to question seven, relating to the definition of a unit, replies seem to agree fairly. Dr. Lincoln's statement is slightly different from any others, namely: "The unit of antitoxin is the smallest amount of antitoxin which, when given to a guinea-pig of standard size (250–300 Gm.), mixed with 100 times its minimum fatal dose of toxin, will keep the guinea-pig alive till the fifth day. The method of determination should be that of Ehrlich, which eliminates the varying results obtained by using various toxins by comparison with his unit of standard antitoxin." The same writer agrees with quite a number regarding the antiseptic to be employed in the preservation of the product. He says, "As the antiseptic will vary with different manufacturers, they should be left free to choose the best or to change to a better, if one be invented." We take the liberty of quoting verbatim the reply of Dr. Joseph McFarland, of Philadelphia, because it is complete and voices what so many others have said. He says:

"I have carefully read and considered the circular letter, in answer let me reply:

"1. Inasmuch as the therapeutic properties and administration of the serum are now commonly accepted by the physicians of the United States, I certainly think the remedy should find a place in the Pharmacopœia.

2. The name decided upon should be one that would be modified as necessitated by the development of other lines of serum therapy. Thus, Diphtheria Antitoxic Serum, Tetanic Antitoxic Serum, etc., or Antidiptheritic, Antitetanic, Antipneumococcic, Antistreptococcic Serum, etc. Of the two, the latter names are possibly better, because they

commit one less to the exact nature or action of the serum, not declaring the action necessarily *antitoxic*.

3. I do not think it makes great difference. The bottles might be marked, keep in a dark, cool place, by the manufacturer, but I think, regardless of conditions, the serum goes down about 40 to 50 per cent. in six months after marketing.

4. We do not yet know what the best antiseptic is. Presumably most manufacturers use trikresol. Small quantities of formaldehyde are used by some, and have a distinct advantage. I really think this governs itself pretty well. If too much antiseptic is added for preservation, the appearance and quality of the serum are altered, either by turbidity or viscosity, that are extremely difficult to get rid of. Too much formaldehyde makes the injection of the serum painful. If it is thought best to specify, I think 0.4 per cent. of trikresol gives the best results in the long run. If the antiseptic is to be specified, it might be well to give a qualitative test, but if trikesol is to be recommended, its comparatively harmless nature makes it of little consequence whether a little more or less is present.

5. A simple bacteriological test easily made by a tyro would be the addition of 1 Cc. of the serum to 10 Cc. of sterile melted agar-agar, the mixture to be poured into a sterile Petri dish. More than five colonies would condemn the serum.

6. The only test for the identification of the serum is a biological one, and is the ability to protect guinea-pigs from diphtheria infection and intoxication. This can only be done by an expert.

7. An immunizing unit—or a 'unit'—is the least quantity of the serum that will protect against what Ehrlich has described as the $_{d}$ dose of diptheria toxin. The $_{d}$ dose equals 100 minimum fa al doses of the toxin in which no epitoxoids are present, but varies on one or the other side, according to the presence of these by-products. The $_{d}$ dose is calculated by comparison with a standard serum. I very much doubt the propriety of placing the lengthy details of the technique of testing in the Phrrmacopœia.

I think, in addition, it would be well to give some advice concerning the presence of excess of solids in the serum, though judging by the experience of certain makers who extensively manipulate it, it makes very little difference in just what condition it is, so long as it has the strength, is free from bacteria, and contains no poisonous antiseptics."

One of the replies refers especially to the important fact that the German Pharmacopœia recognizes antitoxin. Prof. Chas. Caspari, Jr, says, "The German Pharmacopœia of 1900 contains a very good article on antidiptheritic serum, which I think it might be well for the United States Pharmacopœia to follow." This suggestion has prompted your committee to submit a translation of the text relating to the product from the German Pharmacopœia. It is as follows:

SERUM ANTIDIPTHERITICUM. (Ph. Ger., 1900, p. 328.)

"The blood serum of horses that have been immunized against the toxin of diphtheria. It is placed on the market by authorized factories after being tested by the Royal Prussian Institute for experimental therapy at Frankfurt-am-Main, as to strength in units of immunization (Immunisirungs-einheiten, I. E.), as to its sterility, and as to its contents in preserving material (phenol or trikresol), and after having been authorized for sale.

It is placed on the market in fluid and solid form. Fluid and solid anti-diphtheritic serum are sold only in vials officially sealed, and upon the labels of which are entered the place of manufacture, the content of antitoxin per Cc., as well as the whole content of the vial, the test number and the date of official test. These vials are contained in light-proof packages, upon the outside of which the same data are recorded. The seals are marked on one side with an eagle or a lion; on the other with the number of immunization units contained in the entire amount.

Liquid diphtheria antitoxin is a yellowish, transparent fluid, having the odor of the

preserving agent, and with, at most, only a slight sediment. It comes in vials of various sizes and color, the contents of which represent from 100 to 3000 immunization units. The sizes most used are No. 0, 200 immunization units; No. 1, 500–600 immunization units; No. 2, 1000 immunization units; No. 3, 1500 immunization units. Diphtheria antitoxin, which contains more than 300 immunization units in each Cc., is classed as a high potency serum.

The solid diphtheria antitoxin is a dried, high potency serum, containing at least 500 units per gramme and free from antiseptic or other foreign additions. It consists of a yellowish-white powder or yellow transparent lamella, which, by the addition of 10 parts of water, dissolves to a liquid corresponding in color and general appearance to the liquid diphtheria antitoxin. It is to be sold in white glass-stoppered vials of a capacity of from two to six Cc. each, containing single doses of from 250 to 1000 units. The solution is to be made freshly when needed, in the original vials, by the addition of 1 Cc. of sterilized water for each 250 units. This solution should be clear except for small floccules of albumen, and is to be delivered in the original bottles. Antitoxin with marked permanent cloudiness, or with copious sediment, as well as antitoxin bearing a test number which has been ordered withdrawn, is not allowed to be sold in the pharmacies.

To be preserved in a cool place and protected from light."

The replies of a negative character are most of them quite brief. One states, "Desirable as the introduction of the anti-diphtheritic serum into the United States Pharmacopœia would be, I believe that the conditions relating to its preparation, the absence of uniformity among the preparations and the difficulties in standardization at the present time, are such as to preclude its introduction on a scientific basis." The one argument used in most of the communications in this class is expressed by Jno. F. Milliken and Company, namely, that "the article has not passed the experimental stage." Dr. Schauffer, of Kansas City, says, "Other serums, the value of which is not so well settled, will, with certain justice, also demand admission, if once the door is opened. Let serum therapy stand on a surer foundation first." Dr. E. G. Matson, Department of Public Safety, Pittsburg, says, "Unless the National Government should provide means of testing like those of the German Imperial Government, there will be little use in making the preparation official, since apothecaries cannot by any possibility be expected to ascertain the strength of what they sell. A very considerable equipment and experience in testing are required, so that it could only be done where such work is constantly done, or in other words, by the producers themselves."

The same writer calls attention to the fact that in order to get uniformity it is necessary to have an arbitrary standard, like that of Ehrlich and the German government.

A careful study of these opinions by your Committee leads us to the conclusion that the coming revision of the United States Pharmacopœia should follow the example of the German Pharmacopœia and officially recognize diphtheria antitoxin. The product is in almost universal use to-day by progressive physicians, and it should be possible to officially recognize it in such a manner that the sick could be protected against weakened and worthless serum, and the retail druggist could be protected in its sale. In Germany this is done by the paternalism of the Imperial government, but in this country the whole genius of our national institutions is against governmental paternalism. While it is vitally necessary, if diphtheria antitoxin be recognized by our Pharmacopœia, that it be standardized in order to make the recognition of any value, it would be as unwise to subject the control of the standardization to political influences as it would be to issue the United States Pharmacopœia under such auspices. We do not want science by government in this country.

At the same time it should be possible to provide some means of controlling the strength of diphtheria antitoxin without governmental supervision. We believe that this

can be done by requiring of manufacturers that all diphtheria antitoxin sold as "United States Pharmacopœia, 1900–1910," shall state upon the *label* of each container: (1) the number of immunizing units in each Cc.; (2) the total number of immunizing units in each container; and (3) the date after which the antitoxin ceases to have the strength claimed for it; and also that there shall accompany each package sold a dated and signed *voucher* by the manufacturer guaranteeing: (1) the unit strength of the product in each Cc.; (2) the total unit strength of the package; and (3) the date after which the antitoxin ceases to have the strength claimed for it. It might be well, also, to require that both label and voucher shall be numbered with a laboratory number of the lot made.

The Pharmacopœia should adopt a standard method for manufacturers to follow in determining unit-strength, probably Ehrlich's method, and provide for a series of standard strengths of antitoxin.

By this method the retail druggist could obtain adequate protection by buying of manufacturers who could and would guarantee it. He would not need to make costly tests requiring unusual facilities, nor would he be compelled to have them made by political government inspectors, but he could secure the fullest measure of protection by placing the burden of responsibility upon the shoulders of the maker, where it properly belongs.

Your Committee would therefore recommend that this Association send a copy of this report and the accompanying communications to the Chairman of the Revision Committee of the United States Pharmacopœia (1900–1910), and ask that he issue a special circular to members of the Committee, based upon this report, requesting that a special vote be taken upon the question of the introduction of diphtheria antitoxin in the United States Pharmacopœia.

For the Committee, L. E. SAYRE, *Chairman.*

THE CHAIRMAN: Gentlemen, you have heard the report of your sub-committee. What is your pleasure?

Mr. Mayo, seconded by Mr. Lyons, moved to receive, and that the recommendations be adopted. Carried.

THE CHAIRMAN: The committee has requested that a paper on the topic of diphtheria antitoxin be read at this time. It is out of order at this time, therefore I shall not ask that it be read unless the Section so desires. What is your pleasure? If it is not read now, it will be read some other time. It seems to me it would be well to read it now.

Mr. Hurty, seconded by Mr. Searby, moved that it be read now, and the motion was adopted.

Mr. England thereupon presented the paper in abstract, the full text being as follows:

DIPHTHERIA ANTITOXIN AND ITS RECOGNITION BY THE U. S. PHARMACOPŒIA.

BY JOSEPH W. ENGLAND.

At the meeting of your Association held in Richmond last May, the writer read a paper urging the pharmacopœial recognition of diphtheria antitoxin. Since that time a new edition of the German Pharmacopœia has been issued, and for the first time in the history of pharmacopœias, diphtheria antitoxin has been recognized.

The importance of the official recognition of antitoxin cannot be over-

estimated. Fortunately, antitoxin has been prepared in the past by reliable firms; but the only way to safeguard its quality in the future, and prevent unscrupulous firms marketing spurious products, is to officially recognize it, following somewhat the lines of requirements of the German Pharmacopœia.

This authority, after defining diphtheria antitoxin as "blood serum from horses immunized against diphtheria poison," provides for a manner of testing and selling. It requires also that a vial of the liquid shall be labeled with the name of the maker, the content of immunizing units in each cubic centimeter, and the total number of units in each vial. The liquid must not contain more than a slight precipitate, and have the odor of the preservative (trikresol or phenol). The serums are all numbered by governmental authority, and after their numbers have been called in, are not allowed to be dispensed.

It will be noted especially that the content of immunizing units in each cubic centimeter and the total number of units in each vial are required to be stated on the label. This is an admirable provision, and, with the official recognition of antitoxin by the U. S. Pharmacopœia, it should be required. It is to the credit of the American manufacturers that one of their number was the first in the world to protect the quality of antitoxin, by dating each package with its "life" so that old or weakened antitoxin could not be administered. The numbering system of the German Pharmacopœia does not compare in simplicity and efficiency with the dating system.

As a class, the serum products have come to stay. While many remedies after introduction fall into disuse, the few that survive are added to the list of "the tried and the true." Never before in the history of medical practice have such strenuous efforts been made to ascertain the exact truth regarding new remedies and their limitations in disease treatment as to-day, and while whim and fancy may have some influence in affecting the life of a new remedy, its own inherent possibilities for good are really the determining factor; otherwise there could be no progress in medical practice.

One of the most important of the serum products is diphtheria antitoxin. This is pre-eminently an emergency remedy. When it is wanted, it is wanted at once. The retail pharmacist is the natural source of supply for it, and it is imperative for him to keep a constant stock in anticipation of demands, and good business policy to acquaint his physician of this fact. He is frequently asked for information regarding diphtheria antitoxin, viz., dosage, safety of administration, how and when necessary to repeat, etc. The writer shall emphasize those points which seem to have practical value.

Briefly, diphtheria antitoxin is prepared by a reaction between the tissues of horses and injected diphtheria toxins, whereby an antitoxin is

formed. To prepare the toxins, diphtheria bacilli are grown in faintly alkaline bouillon; toxins are produced, and the bacilli are killed by the addition of trikresol, and their dead bodies filtered out.

The strength of the toxin solution is determined by its injection into guinea-pigs, and it is then injected in gradually increasing amounts into horses, until trial bleedings demonstrate that the animal will produce antitoxin of sufficient strength to be valuable, when full bleedings are made; this period being from four to six months. The blood is collected in sterile bottles, set aside for a time to clot, and the serum is pipetted off and preserved with trikresol. The serum is then standardized, the standardization being expressed in immunizing units. A unit is the amount of antitoxin necessary to protect a standard-weight guinea-pig (one-half pound in weight) against 100 times its minimum fatal dose of toxin. The finished product is placed in glass tubes, containing from 250 to 500 units to each Cc., and hermetically sealed.

In the making of this diphtheritic antidote the natural processes that take place in a human body infected with diphtheria are duplicated in the horse, with this difference, that in the human body the diphtheria organisms multiply with almost unthinkable rapidity and as rapidly develop virulently-poisonous toxins, which are the causes that bring about death, while in the horse its body is not infected by the diphtheria bacilli at all, but, subjected to a toxin free from bacteria, develops an antitoxin capable of combating diphtheria and its effects in the human body in the same manner as does the body itself.

In other words, when antitoxin is used in the treatment of diphtheria, the natural immunity of the human body is greatly increased; just as we may give certain enzymes—diastase, pepsin, pancreatin, papoid, etc.—to fortify the natural digestive processes.

Commercially, antitoxin is sold in this country in vials containing either (1) over 250 units in each Cc. or (2) over 500 in each Cc. In Germany, according to the German Pharmacopœia, it is sold in vials, containing a total of from 100 to 3,000 units, the general range of doses in Germany being from 200 to 1,500 units. Antitoxin containing over 300 units to each Cc. is called high potency antitoxin.

In this country much more successful results in reducing the mortality rate in diphtheria have been achieved than in foreign lands, and this has been brought about by the fact that American physicians inject antitoxin earlier in the disease, and inject a far larger number of units. The death-rate from diphtheria abroad is full 10 per cent.; in this country it is one-half this. Where the Germans, for example, inject usually from 200 to 1,500 units, the Americans have been using from 500 to 1,000 units for immunizing doses, and from 1,000 to 3,000 units for curative doses, doubled in quantity at the second injection if necessary, the trend of practice being distinctly toward still higher doses, and the results of the

American practice speak for themselves in the cutting of the death-rate in two.

The advantages of using high potency antitoxin rests in the fact that less volumes are required for injections, and the less the volume the more rapid the absorption. While the high potency antitoxin weakens more quickly in strength than the low potency, it can lose a much larger number of units and still remain much more effective than a weakened low-potency serum. The disadvantages of using very high-potency serums (*i. e.*, 500 units to each Cc.) rests in the fact that, as few horses yield it, the supply is limited. The American physicians use very high-potency serum for very grave cases and the lower potency serum for average cases. The supply of antitoxin containing from 250 to 300 units to each Cc. is practically unlimited.

If the Pharmacopœia recognizes diphtheria antitoxin, it would seem to be the part of wisdom to follow the general trend of medical practice towards larger doses and require not less than 250 or 300 units in each Cc., and more if practicable. In this way the usual dose of from 2 to 8 or 10 Cc. would represent from 500 to 3,000 units or more.

It must not be forgotten that the basis of value in an antitoxin is always the number of units it contains; at the same time good medical practice demands that the volume of liquid to be injected should not be too large, should be uniform in amount, and should be uniform in unit strength, so that no matter what make of antitoxin was used, the same volume of liquid would always contain the same number of units.

The limit of dose of antitoxin that may be safely administered has never been definitely fixed. In a most interesting and instructive paper by Dr. John H. McCollom, of the Boston City Hospital, entitled a "Plea for Larger Doses of Antitoxin," published in the Medical and Surgical Report of the Boston City Hospital for 1900, he reports upon 5,000 cases of diphtheria, in which were employed injections of from 5,000 to 10,000 units as initiatory doses, repeated every four hours, and as much as 60,000 to 100,000 units administered in from twelve to twenty-four hours.

In the class of apparently hopeless cases, where further or any administration of antitoxin has been heretofore thought to be futile, it has been proven, beyond a question of doubt, by Dr. McCollom, that antitoxin has a positive value and should be administered in all stages of the disease. It matters not how advanced or severe the conditions may be, antitoxin should be administered in large doses, frequently repeated. The absolute safety to the patient of large doses of antitoxin has also been demonstrated.

Probably one of the most frequent inquiries made by physicians is, How much antitoxin is it safe to administer? In reply to this it may be stated, as proven by experiments of Dr. McCollom, from 500 to 100,000 units in twelve to twenty-four hours, the initiatory dose being from 2,000 to 10,000 units, according to the severity of the type; a repetition of dose should be

made at intervals of not less than four to six hours, or more often if necessary. The treatment being perfectly harmless, there can be no danger of over-administration; the only danger lies in insufficient amounts being administered.

For immunizing the dose is from 500 to 1000 units; children require as large a dosage as adults, since they are much more susceptible to the disease.

In order to get the best results with antitoxin, it should be administered as early in the disease as possible.

The following interesting laboratory experiments, demonstrating the necessity of administering sufficient antitoxin, or else no beneficial results, will be noted:

Where 10 units of antitoxin have saved from death a guinea-pig poisoned with toxin, nine units of the same serum, used under the same conditions, with a guinea pig of the same family and weight, have failed to save life.

This illustration is merely pointed out as a cause why it is that when an insufficient dosage is administered there is no apparent benefit from the treatment.

Another feature is interesting, likewise, and that is the necessity of administering double the amount when the dose is repeated. In diphtheria there are active bacilli developing and growing at a rapid rate. When an insufficient amount of antitoxin is administered, by the time a repetition of the dose is made, a sufficient time has elapsed for these bacilli to increase and multiply, and develop toxins, which latter are rapidly absorbed by the system, and the conditions are as bad, if not worse, than they were at the time injections were first made; consequently, the same amount of a second injection would not be of benefit, whereas double the amount of antitoxin would probably overcome and neutralize the toxins.

Antitoxin should be kept in a moderately cool place, ice-chest preferred, and it should be kept from exposure to light.

Antitoxin has a tendency to gradually lose strength, and for this reason should be dated with the date when it is to be returned for fresh stock. The usual life of an antitoxin, before it begins to deteriorate to any appreciable extent, is about six months.

Should antitoxin be administered after the expiration of the time that it should have been returned, its administration would be perfectly safe, but the product would not be of full strength, and with a life-saving remedy no hazardous risks should be taken.

Mr. England's presentation of his subject was greeted with applause.

THE CHAIRMAN: The Committee on United States Pharmacopœia reported to the general session, and this report was referred to the Scientific Section. What shall be done with it?

MR. ELIEL: I move that it be read here.

The motion was seconded by Mr. Stedem and carried, and Mr. Eliel read the report in part, the full text being as follows:

REPORT OF COMMITTEE ON REVISION OF UNITED STATES PHARMACOPŒIA.

To the Officers and Members of the American Pharmaceutical Association: Your Committee on the Revision of the United States Pharmacopœia submits the following:

OINTMENT OF NITRATE OF MERCURY.—There is some complaint regarding the present formula. The formula of 1870 (Lard and Neatsfoot Oil) was satisfactory, and a return to this formula is recommended.

The alkaloid of SANGUINARINE is used to a large extent, and should be made official.

The directions to melt and soften Aloes in the manufacture of COMPOUND EXTRACT OF COLOCYNTH should be omitted.

The Resin of Jalap should be used in the manufacture of COMPOUND CATHARTIC PILLS, instead of the Extract.

The strength of CHLORINATED LIME should be reduced from 35 per cent. to 25 per cent.

Spirit of Ammonia.—By the official method of preparation none stronger than 2 per cent. can be made in laboratory work. In order to make a 10 per cent. preparation it is found necessary to pass Ammonia Gas into Alcohol several hours under pressure, the receiver being closed with a mercury safety tube outlet.

Salicin should be defined as a glucoside (see Voswinkel's Work, Ber. Dtsch. Ph. Ges., 1900, p. 31).

Aromatic Waters prepared with Calcium Phosphate Prec'd do not keep as well as those made by the cotton process. The hot water process is recommended.

Mass of Mercury.—In making this the metal can be more quickly extinguished by using about three times the pharmacopœial quantity of Glycerin mixed with Honey of Rose. The finished mass will be too soft, but can be easily hardened by placing between folds of bibulous paper for a few hours.

Wax.—The resin test for wax should be changed to direct that the alkaline solution be filtered through glass wool or asbestos (see A. J. P., 1900, p. 74).

We desire at this time to refer to the suggestions previously made by this committee, and to especially emphasize the following, deeming their character to be such as to merit your most careful consideration at this time:

1. That granulated Opium be used for the DEODORIZED OPIUM AND TINCTURE OF OPIUM, and the use of Precipitated Calcium Phosphate omitted.

2. Deprive the seeds of COLCHICUM and STROPHANTHUS of their oil before the preparation of the Tincture.

3. Adoption of the formula given in the report of this committee, 1895, for SAPO MOLLIS.

4. Standardization of ESSENTIAL OILS as suggested, 1896.

5. Change standard of LINUM, SINAPIS ALBA and SINAPIS NIGRA, for reasons given in report, 1896.

6. Tincture of Nux Vomica. Returning to formula of 1880, retaining the standard strength as in the 1890 edition.

7. Standardization of PODOPHYLLUM, PRUNUS VIRGINIANA, SANGUINARIA, SARSAPARILLA, QUILLAYA, SENEGA STROPHANTHUS, 1897.

8. The report of 1898, paragraphs 1 to 13 inclusive, are especially referred to the Committee of Revision for their consideration.

9. The same report, referring to the report of 1896, on which no action was taken, viz., to dismiss all TINCTURES having a fluid extract of the same drug official, and substitute for such tinctures and fluid extracts a 50 per cent. tincture under *distinctive title.*

10. Paragraphs 16 and 17 of the same report, referring to SPIRIT OF NITROUS ETHER and CRUDE CARBOLIC ACID.

11. Report of 1899, paragraph 1, referring to present formula for COLD CREAM.

We submit that the general suggestions in this (1899) somewhat lengthy report are of sufficient importance to receive the most careful consideration of the final Committee on Revision, especially so because no discussion was had on any of the suggestions.

F. W. E. STEDEM,
J. O. SCHLOTTERBECK,
H. V. ARNY,
LEO ELIEL.

The report was received with applause.

The chair stated that as the report contained some valuable suggestions it would seem appropriate that it be referred to the Committee on Revision of the Pharmacopœia, and it was so ordered.

The chair stated that the next order of business was the nomination of officers of the Section for the ensuing year, and read the by-law on the subject.

Mr. Patton nominated Mr. Lyman F. Kebler for Chairman, and Mr. Stedem seconded the nomination.

Mr. Hallberg put Mr. W. A. Puckner in nomination for this office.

Nominations for Chairman were then closed for the time being.

The chair called for nominations for Secretary, and Mr. Caspari nominated Mr. Francis Hemm, of St. Louis, Mr. Whelpley seconding the nomination.

Mr. Lowe nominated Mr. Jos. W. England, and nominations for Secretary were closed.

THE CHAIRMAN: The first paper to be brought to your attention is one upon "The So-Called Pure Berberine of R. Gaze," by H. M. Gordin and C. G. Merrell.

Mr. Gordin then presented his paper upon berberine in abstract, the full text being as follows:

THE SO-CALLED PURE BERBERINE OF R. GAZE.

BY H. M. GORDIN AND C. G. MERRELL.

The results of the following investigations are so contrary to those obtained by a very reputable chemist, that it is with considerable hesitation that they are published. Acknowledgment of any error in the work presented, if such be shown to exist, will be cheerfully made, and other investigators are invited to verify these results or point out any error existing. After these remarks, it is only necessary to say that the experiments here recorded have been repeated very carefully and many times, and always with the same results. They were begun at the University of Michigan and completed in this laboratory.

If the text-books* be consulted for the preparation of berberine, it will

* Beilstein, 3d edition, Vol. III, 798; E. Schmidt, Pharm. Chem., 1896, 1321.

be found that this alkaloid can be prepared in two ways. The first method consists in liberating the alkaloid from its sulphate by means of barium hydrate, removing excess of barium by a current of carbon dioxide and concentrating (preferably in vacuo) the solution of free berberine so obtained to the point of crystallization.

As the sulphate of berberine is very easily obtained by simply precipitating a concentrated aqueous extract of any berberine-bearing drug by excess of sulphuric acid, all of the berberine on the market is made by this method or some slight modification of it.

The second method was proposed by R. Gaze,* and consists in preparing first a very insoluble compound of berberine with acetone from any of the salts of the alkaloid, and then liberating free berberine from this acetone compound by boiling this compound with a mixture of alcohol and chloroform for twelve hours under a reflux condenser. Most of the solvent is then distilled off, and the berberine, which separates out on cooling, is recrystallized from water. In preparing berberine by Gaze's method, the alcohol and chloroform were tested for hydrochloric acid, as well as for other chlorine compounds, and only such materials were used in which no trace of chlorine compounds could be detected by the methods of the United States Pharmacopœia, 1890, as given under chloroform and alcohol. The acetone compound was prepared from the sulphate by the method given by Gaze,† and was thoroughly washed and dried. Ten parts of the acetone compound were then boiled with 30 parts of chloroform and 250 parts of alcohol for twelve hours under a reversed condenser. After standing over night in a cool place, a large quantity of the yellow compound (which according to Gaze is pure berberine) separated out. The liquid was removed by filtration without previous concentration, the yellow compound washed with cold alcohol, then with ether, dried, recrystallized from water, and dried at 50° C. in dry air. The mother liquid was not treated at all. Yield about 6.8 Gm. According to Gaze, the chloroform simply splits off the acetone, leaving pure berberine behind.

This method of liberating free berberine, even on superficial examination, seems very strange. As the mixture is boiled under a reversed condenser, the liberated acetone ought to constantly return to the liquid, and all that we could expect is that the chloroform would displace the acetone and form with the berberine, the berberine-chloroform of E. Schmidt.‡ As was shown by Gaze § himself, chloroform easily displaces bromoform from the bromoform compound of berberine under favorable conditions; we ought therefore to expect the chloroform compound rather than the free alkaloid when the acetone compound is boiled with chloroform.

When the so-called "pure" berberine obtained by Gaze's method, is

* Arch. d. Pharm., 1890, 607.

† Loc. cit.

‡ Arch. d. Pharm., 1887, Febr.

§ *Ib.*, 1890, 624.

compared with the same alkaloid prepared from its sulphate by means of barium hydrate, it will be found that the two compounds differ strikingly from each other.

The appearance and melting point are both different, and the property of absorbing carbon dioxide with great avidity from the air, which is so characteristic in the ordinary berberine that E. Merck ‡ declared himself unable to prepare berberine perfectly free from carbon dioxide, without working in a current of hydrogen, is not possessed by Gaze's berberine. This is the more remarkable when it is considered that when Gaze's berberine is converted into a sulphate by boiling it with dilute sulphuric acid and the berberine again set free by means of barium hydrate as in the first method of making berberine, the alkaloid so obtained is in every respect like the one usually obtained from the sulphate without passing through the acetone compound.

But the behavior of Gaze's "pure" berberine becomes more puzzling yet when it is treated with certain reagents. If to a solution of Gaze's berberine in hot water an excess of a perfectly neutral solution of potassium iodide be added, a very voluminous precipitate is formed, and the liquid when filtered from the precipitate is very nearly colorless.§ It was thought at first that the unchanged berberine is simply salted out by the potassium iodide. But aside from the fact that salting out generally takes place only in concentrated solutions, it was shown that the precipitate is not unchanged berberine. Three Gm. of Gaze's berberine was dissolved in about 100 Cc. of hot water and a solution of about 5 Gm. potassium iodide added to the solution of the berberine. After cooling, the liquid was filtered and the precipitate washed thoroughly with water by means of the pump. As the precipitate gave definite reactions of iodine, it was thought that possibly it contained some potassium iodide by absorption. It was decided therefore to recrystallize the precipitate from boiling water. At this step it was noticed that the precipitate could not be the unchanged berberine, for it took over 2000 Cc. of hot water to dissolve it, whereas the substance started with, *i. e.*, Gaze's berberine, dissolved very easily in hot water. The hot solution was filtered and the precipitate which separated out on cooling, again washed repeatedly by means of the pump and examined.

It was found that it melted at about 155° C., whereas Gaze's berberine only darkened at that temperature, and did not melt even far above 200° C. Tested with starch and nitrous acid, it gave abundant evidence of its containing iodine. It was then thought that the precipitate produced by potassium iodide in solutions of Gaze's berberine in the absence of acids might be a double compound of berberine and potsasium iodide. This idea had to be abandoned because on calcining about 3 Gm. of

‡ Chem. Centralblatt, 1893, 352.

§ J. Am. Chem. Soc., 1899, 741.

the precipitate in a platinum crucible, no trace whatever was left. It could not be admitted that Gaze's berberine in watery solution acts like a hydrate and reacts with potassium iodide to form berberine hydriodide and potassium hydrate, for the simple reason that the filtrate from the precipitate formed, is perfectly neutral to litmus and phenolphtalein.

In order to get a better insight into the nature of the reaction, it was decided to work with standardized potassium iodide and see whether any potassium iodide is consumed. 0.1474 Gm. of Gaze's berberine was dissolved in hot water, 40 Cc. $\frac{N}{20}$ potassium iodide added, the liquid cooled, made up to 100 Cc., filtered, and in 50 Cc. of the filtrate the potassium iodide estimated by $\frac{N}{20}$ silver nitrate, using potassium chromate as indicator. The amount of $\frac{N}{20}$ $AgNO_3$ required was exactly 20 Cc., showing that apparently no potassium iodide was consumed at all. The experiment was repeated, taking 0.6386 Gm. of Gaze's berberine, $\frac{N}{20}$ KI 100 Cc., the solution made up to 500 Cc., filtered, and in 250 Cc. of the filtrate the potassium iodide estimated as before. It was found that 50 Cc. of $\frac{N}{20}$ silver nitrate was required, showing again that no potassium iodide was consumed in the precipitation of the berberine by potassium iodide.

It was next decided to try the action of dilute acids upon Gaze's berberine. In another place * I have already shown that when Gaze's berberine is treated with excess of standard acid and the excess estimated by my general alkalimetric method,† using either potassium iodide or Mayer's reagent, or Wagner's reagent as precipitants, the astonishing fact is revealed that no acid is consumed by the berberine at all. In order to show this quantitatively, I weighed out definite quantities of Gaze's berberine into three 100 Cc. flasks, dissolved the substance in definite quantities of $\frac{N}{40}$ sulphuric acid, and added to one flask excess of potassium iodide solution, to another excess of Mayer's reagent, and to the third Wagner's reagent (2 per cent. iodine). The flasks were then filled up to the mark, filtered, and the excess of acid in 50 Cc. of the filtrates estimated by $\frac{N}{40}$ potassium hydrate, using phenolphtalein as indicator.

Substance.	$\frac{N}{40}$ acid taken.	Precipitant.	$\frac{N}{40}$ alkali for ½.	Acid consumed.
0.557	75 Cc.	Pot. iod.	37.5 Cc.	0
0.2341	35 Cc.	Mayer's Rgt.	17.5 Cc.	0
0.1683	30 Cc.	Wagner's Rgt.	15 Cc.	0

Supposing that boiling Gaze's berberine with acid would make the alkaloid take up some acid, 0.4231 Gm. of Gaze's berberine was boiled under a reversed condenser with 75 Cc. of $\frac{N}{40}$ sulphuric acid for eight

* Berichte d. Deutsch Chem. Ges., 1899. 2876; Pharm. Arch., Vol. 2, No. 10.

† Ber. d. Deutsch. Chem. Gesel., 1899, 2871.

hours, and the amount of acid estimated as above. Just 37.5 Cc. of $\frac{N}{40}$ potassium hydrate was required for one-half of the liquid. Again no acid then was consumed. Now it was reasonable to draw the conclusion that if instead of Gaze's berberine itself, a salt prepared from it be taken and treated with potassium iodide, the potassium iodide would not be consumed and all the acid of the salt of the alkaloid would be set free. We would then have one of the few instances where by using two neutral substances an acid liquid would be obtained.

A few grams of Gaze's berberine was dissolved in hot water, and excess of a 20 per cent. solution of sulphuric acid added. Enough hot water was added to bring all in solution, the liquid boiled for about 15 minutes, and then cooled. The sulphate which separated out was washed a few times with cold water and dried first at 50° C. and then in vacuo over sulphuric acid. 0.9809 gram. of this salt was dissolved in hot water, to the solution 100 Cc. $\frac{N}{20}$ potassium iodide added, and the whole after cooling made up to 500 Cc. 250 Cc. were now filtered off and the free acid titrated with $\frac{N}{40}$ alkali, using phenolphtalein as indicator. The new neutral liquid was now titrated with $\frac{N}{20}$ $AgNO_3$, using potassium chromate as indicator.

Berberine Sulphate.	$\frac{N}{20}$ KI taken.	$\frac{N}{40}$ alkali for $\frac{1}{2}$.	$\frac{N}{20}$ $AgNO_3$ for $\frac{1}{2}$.	Total acid set free.	$\frac{N}{20}$ KI consumed.	Per cent. of acid set free by KI.
0.9809 Gm.	100 Cc.	44.9 Cc.	27.6 Cc.	89.8 Cc.	44.8 Cc.	11.21

We see that in the case of a salt of berberine, potassium iodide is really consumed. As to the liberation of acid, it is easily explained by supposing the alkaloidal salt to change from an acid to a neutral salt. If this supposition be true, the reaction must take place as follows: $C_{20}H_{17}NO_4H_2SO_4 + KI = C_{20}H_{17}NO_4HI + KHSO_4$. That this is really so was proven by estimating the total acid in our berberine sulphate by precipitating its solution with excess of barium acetate and weighing the barium sulphate in the usual way.

0.9667 Gm. of the berberine sulphate gave 0.4308 barium sulphate, which is equivalent to 0.2187 H_2NO_4. Hence the berberine sulphate contained 22.62 per cent. sulphuric acid.

This is almost exactly double the amount set free by the potassium iodide in the previous experiment. Comparing the amounts of acid set free and potassium iodide consumed, as found experimentally with the amounts of these substances as required by above equation, we find them to correspond very well.

Substance.	$\frac{N}{40}$ acid set free by the KI.	$\frac{N}{20}$ KI consumed.	Theory for $C_{20}H_{17}NO_4H_2SO_4$ by above equation.	
			$\frac{N}{40}$ acid.	$\frac{N}{20}$ KI.
0.9809	89.8 Cc.	44.8 Cc.	90.8 Cc.	45.4 Cc.

It can be seen that there is nothing abnormal in the behavior of a salt of berberine toward potassium iodide and standard acid.*

The next step was to examine the behavior of ordinary berberine, prepared from the sulphate by the aid of barium hydrate, towards potassium iodide and acids. Owing to the extreme difficulty of obtaining by this method berberine free from carbon dioxide, it could not be expected that the amounts of potassium iodide and acid would correspond exactly to the amounts of berberine taken unless allowance be made for the indefinite amount of carbon dioxide. But as my purpose was to see whether any acid or potassium iodide was consumed at all by ordinary berberine, it was decided to try the experiment.

Berberine sulphate was therefore treated with a slight excess of barium hydrate, the filtered liquid, kept on the water bath, was saturated with carbon dioxide, the liquid again filtered and concentrated in vacuo to a very small bulk. The berberine which separates out was collected and dried in dry air over caustic potash.

0.7436 Gm. of this berberine was dissolved in 100 Cc. $\frac{N}{40}$ sulphuric acid by the aid of heat. 60 Cc. $\frac{N}{20}$ potassium iodide added, the liquid cooled and made up to 200 Cc. 100 Cc. were now filtered and the excess of acid estimated by means of $\frac{N}{40}$ alkali, using phenolphtalein as indicator. It required 23 Cc. of the alkali, which shows that 54 Cc. $\frac{N}{40}$ acid was consumed, but the end reaction was not sharp, owing undoubtedly to the presence of carbon dioxide. The now neutral liquid was titrated with $\frac{N}{20}$ $AgNO_3$, using potassium chromate as indicator.

It required 17.2 Cc. $\frac{N}{20}$ $AgNO_3$, which shows that 25.6 Cc. $\frac{N}{20}$ KI was consumed. The end reaction was again not very sharp. Pure berberine corresponding to the formula, $C_{20}H_{17}NO_4 + 6H_2O$, ought to have consumed 67 Cc. $\frac{N}{40}$ acid and 33.6 Cc $\frac{N}{20}$ KI. We are certainly justified in the assumption that were the ordinary berberine perfectly free from carbon dioxide, the amounts of acid and potassium iodide would be equivalent to the amount of alkaloid taken. But even as it is, the experiment

* The behavior of acid salts of berberine is only so far different from that of other diacid alkaloids like quinine and cinchonidine, that the latter when thrown out by Wagner's or Mayer's reagents retain two molecules of acid. Thus for quinine and Wagner's reagent the reaction is as follows: $C_{20}H_{24}N_2O_2H_2SO_4 + 2KHI_n = C_{20}H_{24}N_2O_22HHI_n + K_2SO_4$. That this is so, I intend to show in my next paper.

shows that ordinary berberine reacts with reagents in a perfectly normal manner, whereas Gaze's berberine, not consuming any acid or potassium iodide at all, cannot be what it is thought to be.

It was next decided to examine the behavior of the acetone compound itself before it is transformed into "pure" berberine by Gaze's method.

0.576 Gm. of the acetone berberine made by Gaze's method was put into a Kjeldahl flask together with 150 Cc. $\frac{N}{40}$ sulphuric acid and boiled without condenser for one hour and a half, adding boiling water from time to time so as to keep the dilution as nearly constant as possible. The liquid was then cooled, 100 Cc. $\frac{N}{20}$ KI added, and the whole made up to 500 Cc. The amount of acid and potassium iodide consumed was determined as described in the previous experiments.

Acetone comp.	$\frac{N}{40}$ acid taken.	$\frac{N}{20}$ KI taken.	$\frac{N}{40}$ alkali for ½.	$\frac{N}{20}$ $AgNO_3$ for ½.	$\frac{N}{40}$ acid consumed.	$\frac{N}{20}$ KI consumed.	Found pure berberine in the acetone comp.	
							By acid factor.	By potass. iodide factor.
0.576	150 Cc.	100 Cc.	46.7 Cc.	36 Cc.	56.6 Cc.	28 Cc.	0.475 Gm.	0.468

Theoretically there is 0.491 Gm. berberine in the 0.576 Gm. of the acetone compound, $C_{20}H_{17}NO_4C_3H_6O$. We see that the acetone compound consumes both acid and potassium iodide. The reason that the quantities consumed are a little below the theoretical values must lie in the fact that an acid so dilute as is the $\frac{N}{40}$ does not completely decompose the acetone compound within an hour and a half. That a stronger acid quickly and quantitatively converts the acetone compound into a salt, was proven by the following experiment.*

0.6512 Gm. acetone compound was boiled without condenser for half an hour with about 100 Cc. of a 5 per cent. solution of sulphuric acid, the hot liquid was then transferred to a 500 Cc. measuring flask, 100 Cc. $\frac{N}{20}$ KI added, and when cold, made up to 500 Cc. 250 Cc. were now filtered off into another 500 Cc. measuring flask, 50 Cc. $\frac{N}{20}$ $AgNO_3$ and a little dilute nitric acid added, and the liquid again made up to 500 Cc. The liquid was filtered, and in 250 Cc. of the filtrate the excess of $AgNO_3$ determined by Volhard's method.

* In assaying hydrastis by the method proposed by Gordin and A. B. Prescott in another article (J. Chem. Soc., 1899, 732. Arch d. Pharm., 1899, 439), it is therefore necessary to use an acid of at least 5 per cent. strength to decompose the acetone compound.

Acetone Compound taken.	$\frac{N}{20}$ KI taken.	$\frac{N}{20}$ $AgNO_3$ taken for ½.	$\frac{N}{20}$ KCNS required for ½.	$\frac{N}{20}$ KI consumed.	Pure berberine in the acetone compound.	
					Found.	Theory.
0.6512 Gm.	100 Cc.	50 Cc.	8.3 Cc.	33.2 Cc.	85.10	85.20

Having shown by these experiments that berberine itself obtained by the action of barium hydrate upon berberine sulphate, as well as the salts of berberine and the acetone berberine, all react normally with acids and precipitants, I returned to the action of potassium iodide upon Gaze's berberine in the absence of acid, and decided to see whether the estimation of iodine in the free state will also show that no potassium iodide was consumed. For this purpose I estimated the iodine in my $\frac{N}{20}$ potassium iodide solution by setting the iodine free by means of a saturated solution of nitrous acid in concentrated sulphuric acid, and estimating the iodine by means of $\frac{N}{20}$ sodium thiosulphate.* In this way it was established that the $\frac{N}{20}$ potassium iodide solution was strictly $\frac{N}{20}$ also with regard to iodine, as was to be expected. Two samples of Gaze's berberine were now dissolved in a little hot water without the use of acid, excess of $\frac{N}{20}$ potassium iodide added to the solution, and the liquid after cooling made up to 100 Cc. After filtering, the iodine was estimated in 50 Cc. of the filtrate by the above-mentioned method. To my great surprise, I found that considerable quantities of iodine were consumed by the berberine.

Gaze's berberine.	$\frac{N}{20}$ KI taken	$\frac{N}{20}$ sodium thiosulphate for ½.	$\frac{N}{20}$ KI comsumed.
a. 0.4204	50 Cc.	14.5 Cc.	21 Cc.
b. 0.6825	50 Cc.	8 Cc.	34 Cc.

The last two experiments in connection with those which show that silver nitrate does not reveal the consumption of potassium iodide, can only be satisfactorily explained by assuming the body generated by the action of chloroform and alcohol during the twelve hours' boiling, to be not free berberine as Gaze supposed, but berberine hydrochloride $C_{20}H_{17}NO_4HCl + 2H_2O$. This assumption at once clears up the puzzling behavior of Gaze's berberine. It does not absorb carbon dioxide because it is not the free base but a salt of it. It does not take up any acid when

* Fresenius, 6th French edition, 1891, Analyse Quantitative, 406.

it is taken up by acid and precipitated with potassium iodide or Wagner's or Mayer's reagent, because it simply interchanges its acid with the potassium iodide falling out as a hydriodide, leaving an equivalent amount of potassium chloride in solution. Silver nitrate reacting with the potassium chloride exactly as it does with potassium iodide does therefore not show any consumption of the latter salt. Taking the formula of Gaze's berberine to be $C_{20}H_{17}NO_4.HCl + 2H_2O$, all the results recorded in this paper are not only explicable but are quantitatively exact. Taking for example the last two experiments, we find that

a. 0.4204 Gm. of the substance consumed 21 Cc. $\frac{N}{20}$ potassium iodide, and

b. 0.6825 Gm. consumed 34 Cc. $\frac{N}{20}$ potassium iodide.

Theoretically, suppose the substance to be $C_{20}H_{17}NO_4HCl.2H_2O$

a. ought to consume 20.7 Cc. against 21 Cc. $\frac{N}{20}$ potassium iodide, and

b. ought to consume 33.6 Cc. against 34 Cc. $\frac{N}{20}$ potassium iodide as actually found.

The fact that Gaze overlooked the presence of hydrochloric acid is the more remarkable as he states in his article he tested his product by exploding it with potassium nitrate. I have prepared some pure sodium nitrate by dissolving some metallic sodium in water, adding nitric acid to slightly acid reaction and evaporating to dryness. The sodium nitrate thus obtained was perfectly free from chlorine. About three Gm. of this nitrate were intimately mixed with about 0.2 Gm. of the acetone berberine and ignited in a silver crucible. No trace of chlorine could be detected by silver nitrate in the residue after taking it up with hot water and acidulating with nitric acid, showing that the hydrochloric acid does not come from the acetone compound as an impurity.

The same experiment repeated with the compound obtained by boiling the acetone compound with chloroform and alcohol as directed by Gaze, gave abundance of chlorine. The hydrochloric acid must then be generated during the boiling of the berberine with the chloroform. The reaction could be explained by supposing that it takes place according to the following equation: $4C_{20}H_{17}NO_4C_3H_6O + CHCl_3 + 4H_2O = 3C_{20}H_{17}NO_4HCl.2H_2O + C_{20}H_{17}NO_4HCO_2H + C_3H_6O$.

The reaction would be analogous to the one taking place between chloroform and a fixed alkali: $4KOH + CHCl_3 = 3KCl + 2H_2O + HCO_2K$.

Though the quantitative results obtained in the experiments with potassium iodide and silver nitrate show conclusively that the compound corresponds to the formula $C_{20}H_{17}NO_4HCl + 2H_2O$, it was nevertheless decided to estimate the hydrochloric acid in another way. A definite amount was calcined with chlorine-free calcium oxide, the resulting calcium chloride dissolved in diluted nitric acid, excess of silver nitrate added and the silver chloride weighed in the usual way.

Substance taken	0.5737 Gm.
AgCl found	0.1989 Gm.
HCl found	8.82
HCl required for $C_{20}H_{17}NO_4HCl.2H_2O$	8.94

An attempt was also made to estimate the water by drying the substance at 120, but the substance kept on losing weight, becoming darker and darker all the time, showing that by heat considerable decomposition takes place.

The reaction between chloroform and acetone berberine, as given above, ought also to give rise to the formation of berberine formate. Whether this compound can be isolated from the products of the reaction, I shall try to investigate in the near future.

In order to prove that it is the berberine, not the acetone, that decomposes the chloroform into hydrochloric and possibly formic acid, as given in the above equation, a sample (5 Gm.) of ordinary berberine, made from its sulphate by means of barium hydrate, was boiled with chloroform and alcohol exactly in the same way as the acetone compound is treated in Gaze's method for the splitting off of the acetone. After the removal of the mother-liquor by filtration and recrystallizing from water, the substance was found to contain considerable chlorine. Its solution gave a heavy precipitate with silver nitrate and nitric acid insoluble in boiling water, and the precipitate disappeared immediately on the addition of ammonia. The same results were obtained on deflagrating it with chlorine free sodium nitrate, showing conclusively that berberine itself, when boiled with chloroform and alcohol, is mostly converted into a hydrochloride.

As the decomposition of chloroform into hydrochloric (and presumably formic) acid can only be satisfactorily explained by supposing berberine to act like a strong base, it was natural to suppose that other alkaloids, and particularly those endowed with considerable basicity, would also split off hydrochloric acid from chloroform under the same conditions.*

Five Gm. of quinine were then boiled for 12 hours with 15 Gm. chloroform and 125 Gm. alcohol under a reversed condenser. After cooling, the liquid was evaporated nearly to dryness, the residue taken up with hot water and filtered. Only a small quantity went into solution, showing that most of the quinine had not been converted into a salt. The dissolved part was acidulated with nitric acid and tested for hydrochloric acid with silver nitrate. Only a very small amount of a curdy precipitate was formed, which re-dissolved on addition of ammonia.

The next alkaloid tried was morphine, of which 5 Gm. were treated in the same way as quinine. The results were the same as with that alka-

*That a compound of strychnine, chloroform and hydrochloric acid is formed when strychnine and chloroform are heated under pressure to a temperature of 120 to 150° C. was shown by P. Trowbridge (Arch. d. Pharm., 1899, 624).

loid, *i. e.*, most of the morphine remained unattacked, and only a very small quantity of chloride was found.

Another alkaloid tried was hydrastine. Though this alkaloid is only a weak base, it was thought that owing to its constitution being nearly related to berberine, it might behave like this alkaloid towards chloroform.

5 Gm. were then treated in the same way as quinine and morphine. The results showed complete absence of hydrochloric acid, as silver nitrate did not even produce a turbidity.

It can be seen that whereas strong organic bases like quinine and morphine attack chloroform only to a very slight extent even on prolonged boiling, a weak base like hydrastine does not attack it at all. As to the almost quantitative * decomposition of chloroform by berberine, it must be admitted that this alkaloid is a much more powerful base than it is generally considered to be, approaching in basicity the fixed alkalis.

Of the many alkaloids tested with regard to their behavior towards boiling chloroform, piperidine is the only one that is converted to the extent of about 7.5 per cent. (= 10 per cent. of theory) into its hydrochloride.

5 Gm. of piperidine were boiled twelve hours with 15 Gm. $CHCl_3$ and 125 Gm. alcohol. The solvent was then completely distilled off and the residue made up to 100 Cc. with water. 50 Cc. were filtered off and the HCl precipitated by means of $AgNO_3 + HNO_3$. The 50 Cc. gave 0.187 Gm. AgCl (= 7.5 per cent.). As piperidine resembles berberine in that it absorbs carbon dioxide from the air, we might possibly admit that only those alkaloids which have this property are capable of splitting off HCl from chloroform.

Cincinnati, O., July, 1901.

THE CHAIRMAN: There is another paper by Dr. Gordin on a kindred subject, The Quantitative Estimation of Berberine, which I will ask him now to present the salient features of.

Mr. Gordin also presented this paper in abstract, the full text being as follows:

TWO NEW METHODS FOR THE QUANTITATIVE ESTIMATION OF BERBERINE.

BY H. M. GORDIN.

In the foregoing paper I have shown that when an aqueous solution of berberine acid sulphate $C_{20}H_{17}NO_4.H_2SO_4$ is precipitated by a large excess of potassium iodide, the filtrate from the precipitate formed is perfectly colorless and one molecule of a monobasic acid is set free for every mole-

* As given in the beginning of this article, 10 Gm. of acetone berberine gave 6.8 Gm. of pure recrystallized berberine hydrochloride, $C_{20}H_{17}NO_4HCl.2H_2O$, which is 86 per cent. of the theory as required by the above equation.

cule of berberine.* The reaction is probably as follows: $C_{20}H_{17}NO_4.H_2SO_4 + KI = C_{20}H_{17}NO_4.HI + KHSO_4$.

It is evident that by estimating the amount of acid set free by means of standard alkali, we can easily and exactly estimate the amount of berberine existing as an acid sulphate in a neutral solution. In order to base an assay method of berberine upon this principle we must then devise a means of converting other salts of berberine into its acid sulphate. This conversion can be easily accomplished with those salts of berberine which are soluble in alcohol. The addition of a slight excess of sulphuric acid to an alcoholic solution of such salts quickly precipitates the desired acid sulphate, *even in presence of free hydrochloric acid.* In order to make the precipitation more complete it is best to add to the alcoholic solution an equal volume of ether and set the mixture aside for a few hours in a cold place. The reason of this precipitation of the acid sulphate even in presence of free hydrochloric acid in the ethereo-alcoholic solution is because one Gm. of the acid sulphate of berberine requires 14706 Cc. of a mixture of equal volumes of alcohol and ether for solution, whereas one Gm. of berberine hydrochloride dissolves in 1269 Cc. of this mixture. This was established by shaking an excess of these two salts with 50 Cc. of this mixture for two hours, pipetting off 25 Cc., filtering, washing the filter with ether-alcohol, evaporating in a tared vessel, drying at 110° C. and weighing. It was found that 25 Cc. of the above mixture dissolved 0.0197 Gm. of berberine hydrochloride $C_{20}H_{17}NO_4.HCl$ but only 0.0017 Gm. of the acid sulphate $C_{20}H_{17}NO_4.H_2SO_4$.†

That even in the presence of free hydrochloric acid the precipitate is free from chlorine can be easily shown by dissolving some pure berberine hydrochloride in sufficient warm alcohol, adding a few drops hydrochloric acid, then a slight excess of concentrated sulphuric acid previously diluted with three or four times its amount of alcohol. If the liquid is now cooled, mixed with an equal volume of ether and put in a cool place for a few hours, a large amount of precipitate is formed which when collected on a filter, thoroughly washed with ether alcohol, dissolved in water and examined by means of silver nitrate and barium chloride, will be found to contain no trace of hydrochloride but to give a heavy precipitate with barium chloride.‡

In this way it can be established that in an ethereo-alcoholic solution,

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* Most probably a similar change of basicity takes place in the salts of berberine with other polybasic acids.

† The sulphate and the hydrochloride used in this work were very pure and were the same which were used in the previous experiment, where results of estimations of chlorine and sulphuric acid, showing perfect purity of the salts, are given.

‡ Care should be taken not to confound berberine nitrate or berberine hydrochloride, which are liable to separate out, with silver chloride and barium sulphate; the latter do not redissolve on heating the liquid, whereas the former quickly dissolve by gentle heat.

although starting with the hydrochloride and in presence of free hydrochloric acid, a slight excess of sulphuric acid converts the berberine salt into the acid sulphate. The case is just the reverse if the berberine salt be in aqueous solution. Owing to the fact that berberine hydrochloride dissolves in 500 parts of water * and berberine acid sulphate requires but 100 parts of water † for solution, the sulphate is easily converted into the hydrochloride by a slight excess of the halogen acid, and in presence of both sulphuric and hydrochloric acids it is the hydrochloride that is precipitated. This can be shown by dissolving some pure berberine ‡ acid sulphate in a little warm water, adding a few drops dilute sulphuric acid and then a slight excess of hydrochloric acid. If the precipitate which separates out on cooling be collected, thoroughly washed with water, slightly acidulated with hydrochloric acid § and tested with barium chloride, it will be found to be perfectly free from sulphate. ‖

Owing to the fact that in presence of both hydrochloric and sulphuric acids it is the sulphate which falls out in alcoholic solution, the precipitate obtained in the assay method of *Hydrastis canadensis* for berberine proposed by J. U. Lloyd ¶ and afterwards slightly modified by F. A. Thompson ** is not as supposed by these authors berberine hydrochloride, but berberine acid sulphate. This can be shown by dissolving the precipitate obtained in Lloyd-Thompson's method in water and testing the solution with silver nitrate and *barium chloride*. The factor 0.9018 used by these authors ought then to be replaced by the factor for the acid sulphate, which is 0.7736. On the other hand in Linde's method of estimating berberine in fluid extract hydrastis †† the liquid after the addition of sulphuric and hydrochloric acids containing only about 38 per cent. alcohol,‡‡ it is not as supposed by this author, the acid sulphate but chiefly the hydrochloride that is precipitated, as only traces of sulphate can be found in the precipitate and these undoubtedly are due to insufficient washing.*

If then we have an alcoholic solution of berberine salts, for example, an

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* Allen Com. Org. Anal. 2d edition, Vol. III, part II, page 463.

† *Ib.*, page 464.

‡ All salts of berberine can be obtained very pure by first preparing the crystalline acetone berberine and decomposing this by boiling with the suitable acid.

§ Pure water would quickly dissolve away the whole precipitate.

‖ In all these conversions of berberine salts too great an excess of either acid should be avoided so as to eliminate mass action.

¶ Drugg. Circul. 1885, 22.

** Am. J. Pharm. 1893, 370.

†† Pharm. Centralhalle 1895, 354.

‡‡ Supposing a U. S. P. preparation was used.

* Linde uses a definite amount of water for washing.

alcoholic extract of barberry or of hydrastis canadensis, the amount of berberine contained in the extract can be found by adding a slight excess of sulphuric acid, diluting with ether to about double the volume, setting the mixture in a cool place for several hours and then collecting the precipitate in a filter and washing it thoroughly with a mixture of equal volumes of ether and alcohol. The precipitate is then dissolved in water, an excess of a strong solution of potassium iodide is added, the liquid made up to a definite volume, filtered, and in an aliquot part of the now colorless filtrate the amount of acid set free is estimated by means of standard alkali, using phenolphtalein or any suitable indicator. In order to obtain exact results the amount dissolved in the ethereo-alcoholic mother liquor and washings should be added to the final results. Though this amount is very small, the error arising from the slight solubility of the acid sulphate in ether-alcohol will be considerable, for the reason that it is necessary to use considerable ether-alcohol to wash away all free acid. As was shown above, 1 Cc. ether-alcohol dissolves 0.000068 Gm. of the acid sulphate, which corresponds to 0.0000526 Gm. free berberine. Suppose 70 or 80 Cc. of washings are obtained the amount left in solution can be taken to be about 4 milligrams, and as the total amount of berberine in the assay sample is often less than 100 milligrams there would be a loss of about 4 per cent. It is therefore best to collect the mother liquor and washings into a graduated cylinder and add to the final results 0.0000526 Gm. for every Cc. of washing.

In titrating the acid set free from the berberine acid sulphate by potassium iodide by means of standard alkali, care should be taken to standardize the acid and alkali under the same conditions as prevail in the estimation, *i. e.*, the standardization should be carried out in the presence of the same amount of potassium iodide as was used for the precipitation of berberine. I have already shown in several cases that even insoluble substances are capable of influencing the standard.*

In order to test the accuracy of this method of estimating berberine, I proceeded as follows: At first I added 10 Cc. of a 20 per cent. solution of potassium iodide to 20 Cc. of $\frac{N}{10}$ H_2SO_4, and using phenolphtalein as indicator, it was found that under these conditions it took 19.7 Cc. $\frac{N}{10}$ alkali to exactly neutralize the acid. A definite amount of pure berberine hydrochloride, which by an estimation of chlorine was proven to have the composition of $C_{20}H_{17}NO_4.HCl.2H_2O$, was dissolved in warm alcohol; to the solution 1 Cc. of concentrated sulphuric acid, previously diluted with 5 Cc. alcohol, was added, and the whole when cold diluted with an equal volume of ether. After keeping in a cool place over night, the precipitate was collected on a filter, washed with a mixture of equal parts of ether and alcohol, covering the funnel with a watch-glass, until the washings were

* Arch. d. Pharm., 1901, 215; Am. J. Pharm., 1901, 161.

perfectly neutral.* The washings were collected and measured. The precipitate on the filter was then exposed to the air for about fifteen minutes, until most of the ether disappeared, the filter pierced with a pointed glass rod and washed down with water into a 200 Cc. measuring flask. When all the precipitate went into solution, 20 Cc. of a 20 per cent. solution of potassium iodide was added to the liquid and the flask filled up to the mark. The liquid was now filtered through a dry filter, and in 100 Cc. of the filtrate the amount of free acid determined by means of $\frac{N}{40}$ alkali, using phenolphthalein as indicator. One Cc. $\frac{N}{40}$ acid corresponds to 0.00837 Gm. of free berberine. Adding to the amount found by titration the correction for solubility, the results were found to be very exact. One Gm. berberine hydrochloride, $C_{20}H_{17}O_4.HCl.2H_2O$, is equivalent to 0.822 Gm. free berberine.

Hydrochloride Taken.	$\frac{N}{40}$ alkali for ½.	Washings.	Correction.	Found Berberine.
1. 0.2283 Gm.=0.188 berberine.	9.9 Cc. = 10.2 $\frac{N}{40}$ acid.	155 Cc.	0.0105 Gm.	0.188
2. 0.2906 Gm.=0.239 berberine.	13 Cc. = 13.2 $\frac{N}{40}$ acid.	252 Cc.	0.017 Gm.	0.238

In applying the method to crude drugs, like *Hydrastis canadensis* or barberry bark, a definite amount, say 20 Gm., are extracted in a Dunstan & Short apparatus† with hot alcohol on the asbestos plate until the alcohol comes out colorless, or nearly so. The extract when cold is made up to a definite volume, say 100 Cc., and filtered if not perfectly clear. To 25 Cc. of the filtrate one or two Cc. concentrated sulphuric acid, previously mixed with a few Cc. alcohol, is added, the mixture diluted with ether to about double its volume and the assay finished exactly as just described. In the case of hydrastis, the rest of the alcoholic filtrate can be used for the estimation of hydrastine. For this purpose the alcohol from 25 Cc. of the alcoholic extract is distilled off till only a few Cc. are left, the residue diluted with water containing about one per cent. acetic acid and a few per cent. potassium iodide to 25 Cc. The liquid is then filtered and 12.5 Cc. of the filtrate are treated as described in a previous paper.‡ If the liquid in which the berberine is to be estimated is a strong alcoholic extract like normal tincture of hydrastis, 20 Cc. are diluted *with four times its amount of alcohol* to 100 Cc., filtered if necessary, and 25 Cc. of the filtrate are treated exactly as above described.

This method is not well adapted to the assay of liquids containing a

* It is best to moisten one piece of blue litmus paper with the washings and compare the tint with that produced by moistening another piece with pure ether-alcohol.

† Pharm. J. Trans. (3), xiii, 664.

‡ Am. J. Pharm., 1901, 168; Arch. d. Pharm., 1901, 222.

considerable amount of water or containing no alcohol at all, like fluid extract of hydrastis without alcohol. From such liquids, even after dilution with alcohol and filtration, sulphuric acid and ether precipitates much coloring matter besides the berberine salts, so that after the addition of potassium iodide and filtration as above described, the filtrate is sufficiently colored through the presence of the coloring matter to make the final reaction lack in sharpness. Owing to the quickness and simplicity of this assay method, it might be adopted by many even in those cases where the final reaction is not very sharp, *i. e.*, for solutions of berberine salts containing much water.

But a much more exact assay method which can be used in all cases is as follows:

METHOD 2.

Another method of estimating berberine in liquids containing much other matter is to separate the berberine by precipitating it as an insoluble hydroiodide, washing thoroughly with water containing a little potassium iodide and converting the moist hydroiodide into the very insoluble and beautifully crystalline acetone berberine. The latter can then be thoroughly washed with water and after drying at 105° C. to constant weight, weighed. One Gm. acetone berberine is equivalent to 0.8524 Gm. berberine. In order to obtain the acetone compound in a crystalline form suitable for washing it is necessary that the liquid should be warm and should contain about 33 per cent. acetone. It will be seen that the method is based upon the following principles:

1. The crystallized acetone berberine is completely insoluble in cold water. This can be shown by rubbing up some acetone berberine with cold water, filtering, acidulating a few Cc. of the filtrate with hydrochloric acid, and boiling a few minutes. In the presence of berberine in the liquid the latter would become more or less colored, and Mayer's or Wagner's reagent would give a precipitate. But neither the color nor these reagents nor even chlorine water show the presence of berberine.*

2. The dry acetone berberine is quite stable at 100 to 105° C. This was shown by placing about 0.300 Gm. of crystallized acetone berberine upon a watch-glass, weighing the whole and after exposing it to a temperature of 105° C. for three hours and cooling in a desiccator, weighing again. The acetone compound was only very slightly darkened in color, but there was no change in the weight.

3. Though the acetone berberine is completely insoluble in water, it dissolves to some extent in water containing acetone, therefore it is neces-

* The insolubility of acetone berberine was shown already in a previous article by A. B. Prescott and myself (Arch. d. Pharm., 1899, 443); the reason I repeat the proof here is because J. Katz (Pharm. Centralhalle, 1901, 287) seems to doubt the correctness of the statement.

sary in order to obtain very exact results to add a small correction for solubility. As will be seen from the details given below, the mother liquor from the acetone berberine consists of about 8 volumes water and one volume acetone. Of such a mixture it takes about 31,250 parts to dissolve one part of acetone berberine. Though the amount left in solution is very small, it is best to add a correction for the slight solubility. The solubility was established by digesting an excess of finely powdered berberine acetone in 50 Cc. of a mixture of one volume of acetone and eight volumes of water for four hours with frequent shaking. 25 Cc. were then drawn off, filtered, the filter washed, and the liquid evaporated in a tared vessel. After drying at 105° C. to constant weight, it was found that 25 Cc. of above mixture dissolved 0.0008 Gm. acetone berberine; 1 Cc. of such a mixture dissolves then an amount corresponding to 0.0000273 Gm. berberine alkaloid. The way the method is carried out will be seen from the following estimation:

A definite amount of berberine hydrochloride $C_{20}H_{17}NO_4.HCl.2H_2O$ was dissolved in hot water and an excess of a 20 per cent. solution of potassium iodide added to the liquid. After cooling, the precipitate was collected upon a filter and repeatedly washed with water containing about 2 per cent. potassium iodide. The precipitate was then washed down with a definite amount of water* into an Erlenmeyer having the capacity of about 400 Cc. About 54 Cc. water was used. The Erlenmeyer was now placed for about 5 minutes in a water bath, and then about 27 Cc. of acetone added to the mixture. The Erlenmeyer was then loosely stoppered and gently shaken for about ten minutes. 5 Cc. of a 10 per cent. solution of sodium hydrate was now added to the contents of the Erlenmeyer, and the latter again gently shaken for about ten minutes. The deeply yellow-colored hydroiodide disappeared completely, and a large amount of beautiful silky needles of the acetone compound was deposited. The Erlenmeyer was set aside until it was cold, and after adding 157 Cc. water,† put in a cold place over night. The acetone compound was then collected in a tared platinum Gooch crucible, thoroughly washed with water, dried 6 hours *in vacuo* over sulphuric acid, and then at 105° C. to constant weight and weighed.‡ To the results obtained a correction for

Hydrochloride taken.	Mother Liquor.	Correction.	Weight of Acetone Compound.	Berberine found.
0.2334 gr. = 0.1919 gr. berb.	243 Cc.	0.0066	0.217	0.1916

* This was accomplished by placing a known volume of water in the Spritz bottle and measuring the amount left.

† This makes the liquid contain one-ninth acetone.

‡ The asbestos in the Gooch should be washed with water, acetone and weak alkali.

the solubility of the acetone compound in 243 Cc. mother liquid (0.0066 Gm.) was added.

In order to apply this assay method to a crude drug, for example hydrastis, the drug, say 20 Gm. is exhausted as in the first method, the alcoholic extract concentrated to a small bulk and then made up to a large definite volume with water (500–600 Cc.).* The liquid is shaken ½ hour with about 5 Gm. talcum, filtered, and in an aliquot part of the filtrate the berberine is precipitated by an excess of potassium iodide. The estimation is then finished as just described.

In the case of a fluid extract 10 or 20 Cc. are diluted to 250 or 500 Cc. with water. The liquid is then shaken with talcum, filtered, precipitated by potassium iodide, and the assay finished as above.

The second method is certainly much more complicated than the first one, but is very useful as a control, it being capable of great exactness with hardly an element of error and applicable to all cases.

Cincinnati, Ohio, August, 1901.

The speaker elicited the applause of the audience by his interesting presentation of his subject.

MR. STEDEM: I would like to be permitted to ask the speaker a few questions on the subject of berberine. For five or six years past I have been hearing papers read on this subject, but I have never seen a prescription for berberine in my life. I would like to ask whether this is simply a matter of scientific interest, or whether it has a practical value.

MR. GORDIN: I know it is handled by the jobbers, and I presume it has a practical value; but whether so or not is of little consequence to the man who devotes himself to scientific research for the love of knowledge of the secrets of nature.

MR. HALLBERG: I think I can explain why Mr. Stedem never had any demand for berberine—has had no prescription for it. It is probably because he knows it only under the name of muriate of hydrastine.

MR. LLOYD: I want to compliment the writer on the work he has done along this line. I think I am able to appreciate the work he has done. He calls this a crazy alkaloid, I believe, and I have called it that. It is certainly a very interesting subject. I wish particularly to thank the doctor for the very graceful manner in which he has called attention to an error I made some years ago in regard to this berberine. It was a blunder I ought not to have made. I am very glad the doctor corrected me on that. Regardless of whether berberine is of value or not, it is an object of great scientific interest. I remember when it was known under the name of hydrastine—and it should be "hydrastine" yet, because it is found in the greatest abundance in hydrastis cana-

In drying the acetone berberine in the Gooch it is advisable to put on the lower cap, as otherwise the water which remains in the asbestos when it gets hot is liable to dissolve traces of the acetone compound which would then soak through the bottom. It is best to tare the Gooch with cap and cover.

* In concentrated solutions, potassium iodide throws down together with berberine hydriodide much foreign matter. As the hydriodide is very insoluble in excess of potassium iodide, we can dilute the liquid to a very large volume without causing any loss.

densis, and the white alkaloid should have been called something else. It is of little use in medicine generally. I can remember when we worked large quantities of hydrastis root for the berberine alone, and threw away all the balance. We worked it for what is called berberine now, but we called it hydrastine then. These berberine salts, however, were impure. In 1828, Rafinesque gave the name "hydrastine" to the yellow bitter principle of hydrastis canadensis, and several years later the name "berberine" was applied in Europe to an extract of berberis vulgaris.

These investigations are of great value to structural chemistry, and I wish to again thank the doctor for having read so scientific a paper, and think it should have been read before the American Chemical Society, where it would have done the doctor greater service than here. (Applause.)

MR. MEISSNER: I have frequently received a prescription written "hydrastine sulphate, yellow." Am I to understand from Mr. Lloyd that this is berberine sulphate, without doubt?

MR. LLOYD: Yes, sir; berberine sulphate, yellow; that is what is meant. This alkaloid was introduced into medicine by the Eclectics, and for many years used by them as a resinoid. It was called hydrastine, and not berberine. Not many years ago they changed the label and attempted to make the principal name hydrastine sulphate (berberine sulphate), and now we have changed it so as to have berberine sulphate (hydrastine sulphate). The white alkaloid hydrastine came into use long after this yellow alkaloid was known and used, and thus they had to qualify it in some way to show which of these alkaloids they wanted under the name hydrastine, and some doctors now order yellow hydrastine when they want berberine. It is always berberine when they want yellow hydrastine.

Mr. Richard Fischer then presented in abstract the three following papers, alkaloids of (1) Sanguinaria, (2) Glaucium, and (3) Eschscholtzia, of which he was the author, receiving the applause of the audience.*

THE CHAIRMAN: Are there any remarks on the three papers read in abstract?

MR. SAYRE: I would like to call attention to the importance of these papers. You remember Mr. Schlotterbeck last year read a paper on the protopine-yielding plants—protopine and the other alkaloids associated with it. In his paper on chelerythrine and sanguinarine I remember that he said the proper name for sanguinarine should be chelerythrine and that chelerythrine should be sanguinarine. I think this work is very important, and I hope I will see some work done in connection with the physiological effect of protopine. It does seem to me that promises to be a physiological agent of some value.

MR. FISCHER: There has been some work done on that line. Prof. Meyer has examined it and found it to be physiologically quite active. With regard to the point made by Prof. Schlotterbeck last year as to nomenclature, I think it is well taken, though I have adhered to the old nomenclature.

Mr. Stevens presented in abstract the following paper by Mr. J. O. Schlotterbeck:

* Unfortunately the papers were retained by the author and have not been received at the time of going to press. If received later they will be published at the end of the Minutes of this Section or in the Appendix.—THE GENERAL SECRETARY.

DOES ARGEMONE MEXICANA CONTAIN MORPHINE?

BY J. O. SCHLOTTERBECK.

Mexican or prickly poppy, as this plant is more familiarly known, is native to the southern states of North America, Mexico, and the West Indies, but it has spread to the north and has also been accidentally introduced by trading ships into distant tropical and sub-tropical lands to such an extent that it has become a troublesome weed in some localities. The plants are easily propagated from seeds which have for some time been offered by seedsmen for ornamental planting, consequently the prickly poppy has become rather cosmopolitan. The plant is striking in appearance, attains a height of two feet, is erect, bristly and glaucous. The leaves are alternate, sessile, sinuately lobed, armed at the margin and under surface with very sharp prickles. The upper surface of the leaves is beautifully blotched with white. The solitary flowers are single, yellow, about 1¼ inches broad, possessing a soft, bristly ovary with 4–6 red-tipped stigmas. When about to dehisce, to discharge the numerous finely pitted black seeds, the prickly capsule turns from green to brownish-black. When bruised, all parts of the growing plant exude a yellow, milky juice which is acrid, bitter, and of penetrating odor.

The Spanish claim emetic properties for the seeds, and purgative properties for the fixed oil therefrom. Others believe the plant to possess narcotic qualities. The juice of the leaves has gained a reputation among the laity, at least, in the treatment of opacities of the cornea, pain of cephalalgia and inflammation of the eyes. Prickly poppy is official in the Mexican Pharmacopœia, and while reports upon its therapeutic value are very contradictory and at times fabulous, its importance has merited detailed notice of its properties and uses in the dispensatories of the United States.

Considering the repute in which this plant has been held as a remedial agent among Spanish-American people, it is rather remarkable that so little attention has been direction to its chemical study.

Charbonnier* made a chemical study of the leaves and capsules and the oil of the seeds, and reported the presence of morphine. This statement has never been disputed, being still quoted in reference books to the present day. In 1877 Andres Ortega published in the proceedings of the "Escuela Nacional de Medicina de Mexico" his results obtained with several species of Argemone, one of which was the plant under discussion. He operated upon four grammes of the inspissated juice obtained by incising the unripe capsules, and claims to have positively identified morphine. The only other study of this plant was made by Peckolt,† who says that the plant is a very popular remedy in Brazil for almost all known

* Journ. de Pharm. Ser. V. T. VII. 348 (1868).

† Ber. d. d. Pharm. Ges. *8*, 286.

ailments, but that it is not at all prescribed by physicians. He separated a white alkaloid and named it argemonine. The quantity obtained was so small, however, that he could make no study of it.

The very sparse and unsatisfactory information upon the alkaloidal constituents of this plant led the writer to undertake a chemical examination with large quantities of authentic material. One half of the drug, about twenty pounds, was collected for the writer in Kansas and the dried whole plants carefully inspected for foreign material. It was found to be free from admixture. An equal amount was grown in the university gardens. At flowering time it was collected, dried, ground and extracted by the writer, so that there seemed to be no possibility of contamination by other alkaloid-bearing drugs.

The ground plant was moistened with very dilute ammonia water and spread out in a thin layer to dry at ordinary temperature. The dry material was extracted in a large copper apparatus with chloroform until exhausted of alkaloid. The deep green percolate was distilled for recovery of chloroform and the fatty residue digested with several portions of acidulated (acetic acid) water on the water-bath until practically no more color was extracted. The aqueous liquid was concentrated to small volume at low temperature, filtered, and set aside to cool. In a short time the deep yellow liquid had separated a magma of fine yellow needles which looked very much like berberine. These were collected on a filter and recrystallized from water several times. In its behavior with solvents and reagents, and in its physical properties, it was identical with berberine. Chlorine water produced with a solution of this compound the characteristic blood-red color that distinguishes berberine. Potassium iodide precipitated a hydriodide completely, leaving a colorless filtrate, as is the case with berberine. Finally, an acetone compound was made according to the directions of Gaze* and the same quantitative yield obtained. Certainly these qualitative tests amply justify the assertion that this yellow alkaloid is none other than berberine.

Since the presence of berberine in one of the papaveraceæ is rather unusual, it was feared that in spite of the great precautions taken some berberine-bearing drug might have accidentally been mixed with the original, although the amount of berberine separated precluded such possibility. To make doubly sure, however, just one very large plant that had been hung in the drying-room as a museum specimen was employed for a confirmatory examination. This was ground, moistened with ammonia, dried and extracted with absolute alcohol in a liter Soxhlet apparatus. The greenish filtrate, after concentration and cooling, separated needles of potassium nitrate. After removing all the alcohol, the residues were digested with small amounts of acidulated water, the liquid filtered and set

* Arch. d. Pharm., *228*, 607.

aside to evaporate spontaneously. After several days yellow crystals, answering all the well-known tests for berberine, had separated.

The filtrate from the original magma of yellow needles was concentrated, a second crop of berberine salt removed, made alkaline with potassium hydrate, and shaken out several times with ether. The several ethereal portions were filtered, reduced to small volume by distillation, and then set aside in an Erlenmeyer flask. In the course of a few days small whitish warts began to accumulate on the side of the flask. After the ether had practically evaporated, the warts were dissolved in acetic acid, diluted with water, and made alkaline, and shaken out again with ether. This was set aside as before, and after repeating this operation several times, the product became white, and assumed the form of warts and small prisms, melting at 204° C. Sulphuric acid gave a violet-red color, with a fragment of the alkaloid placed upon a white slab. Erdmann's reagent gave a deep violet-blue color. A beautiful green color was obtained when a little more nitric acid was added to Erdmann's reagent. The quantity was too small to permit of further examination, but the qualitative tests mentioned, and the experience of the writer with this substance, leave no doubt that it is the alkaloid protopine. It is doubtless the same alkaloid which Charbonnier and Ortega imperfectly separated and called morphine. Although the color tests are not exactly the same as Peckolt obtained with his argemonine, there is no question that it was protopine that he had in his hands, and not a new alkaloid.*

The original drug marc, after having been extracted with chloroform, was percolated with hot distilled water for the purpose of removing the ammonium salts of the acid combined with the alkaloids in the plant. The dark-colored percolate was reduced to small volume on the steam bath, and set aside to cool. A great crystalline deposit accumulated in the bottom of the vessel. This was collected upon a Buchner filter, and thoroughly washed with cold water. Much of the brownish coloring matter was removed in this manner. The residue, when dry, was grayish in color. It consisted partly of calcium phosphate. The acids in combination with the alkaloids have not been identified with certainty. This will be left for a future paper.

At first thought, the presence of the berberine in the papaveraceæ weakens the position held by the writer and others, that botanical relationship to a great extent predicts chemical relationship. A comparison of the structural formulæ of berberine, as submitted by Perkin, with those of the opium alkaloids papaverine, narcotine, and narceine, demonstrates conclusively that the discovery of berberine in a plant of the poppy family strengthens rather than weakens this position.

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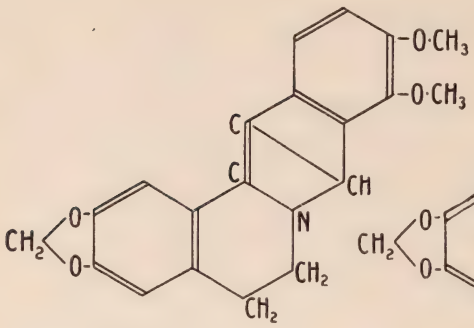
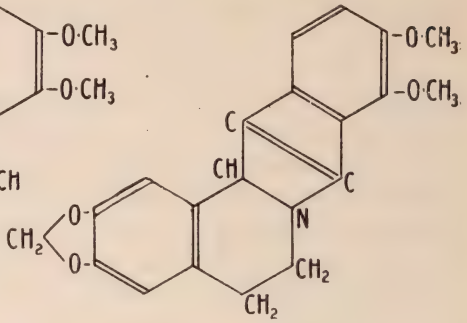
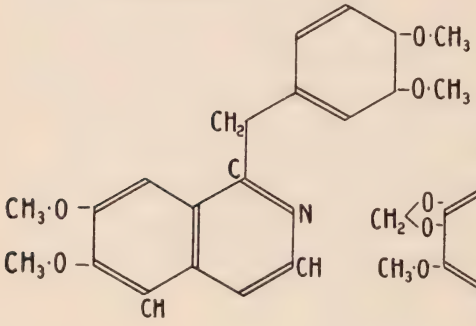
* Journ. Chem. Soc., 1890, I., 997.

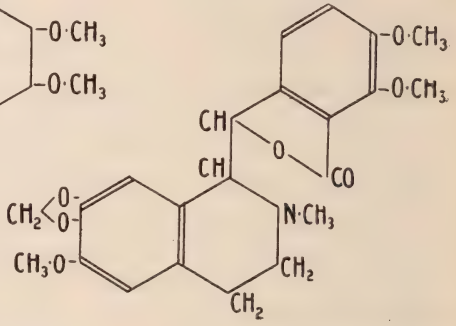
1. BERBERINE. 2.



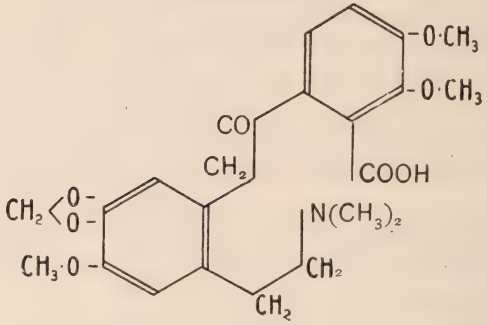


PAPAVERINE. NARCOTINE.





NARCEINE.



These four alkaloids together with hydrastine constitute the isoquinoline group of plant alkaloids. They are, with the exception of narceine, distinct derivatives of the parent base isoquinoline as shown above. Narceine is, however, closely related to the same base. By the constitution of the above-named bases occurring in the poppy family, the botanico-chemical principle spoken of is graphically enunciated.

SUMMARY.

1. Argemone mexicana does *not* contain morphine.
2. The alkaloids of Argemone mexicana are berberine and protopine.
3. The argemonine of Peckolt is protopine.

4. Potassium nitrate is one of the salts existing naturally in the plant.

In conclusion I wish to express my thanks to Mr. C. W. Johnson, who kindly assisted me in this investigation.

School of Pharmacy, University of Michigan, Ann Arbor, Mich.

The chair invited discussion, but there was none, and Mr. Lloyd, at request of the chair, then read in abstract the following paper by Mr. Schlotterbeck and Mr. Watkins:

CONTRIBUTION TO THE CHEMISTRY OF STYLOPHORUM DIPHYLLUM.

BY J. O. SCHLOTTERBECK AND H. C. WATKINS.*

Stylophorum diphyllum, which is popularly known by the suggestive names yellow poppy and celandine poppy, belongs to the papaveraceæ. It grows in low woods from Ohio to Tennessee and westward to Wisconsin and Missouri. It is a perennial, herbaceous plant, with leaves pinnatifid in a manner similar to celandine. The flowers are deep yellow, poppy-like and about an inch broad. The fruits are ovoid and tipped with the persistent style, hence the generic name Stylophorum. All parts of the plant exude a yellow juice, when bruised, which matches the color of the corolla. Under the name "extra large golden seal" the root is mentioned† as a possible accidental admixture of hydrastis.

Undoubtedly J. U. Lloyd was the first to undertake a chemical examination of this plant, but we have not been able to locate the account of his results. In a letter to us he writes that some twenty years ago his brother, C. G. Lloyd, called his attention to this plant and suggested that he make a chemical examination for alkaloids, since its relationship, botanically, indicated their presence. Acting upon this suggestion Mr. Lloyd extracted a considerable quantity of the root and obtained a large alkaloidal product which he provisionally named stylophorine in order that it might have a place in literature. This product was sent to Prof. Eykman, of Tokio, Japan, for critical study, since he was at that time especially engaged in studying the constituents of the papaveraceæ. We have also failed to find in literature a report by this chemist upon Stylophorum or its alkaloids, but that he did concern himself with this subject is shown in an article by Schmidt‡ upon our plant, in which he states that the results communicated by Eykman agreed with his own. These two chemists believe that the principal alkaloid of Stylophorum diphyllum and chelidonine of Chelidonium majus are identical.

A comparative examination of stylophorine§ and chelidonine was made

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* Holder of F. Stearns & Co. Fellowship in the School of Pharmacy, University of Michigan.

† Lloyd, Drugs and Medicines of North America.

‡ Arch. der Pharm. *226*, 622.

§ While Lloyd applied the name stylophorine to the entire alkaloidal product, Schmidt, Selle, Eykman and others employed it specifically to the most abundant alkaloid.

by Schmidt and Selle* in 1890. The identity was fully established, and in addition they obtained evidence of the existence of two other alkaloids, but the isolation was not made because of scarcity of material. This is probably the extent of the work done on this plant at the time it was taken up by the authors.

Through the kindness of Prof. Lloyd we were supplied with 50 pounds of the dried root which was collected by a professional root-digger in the woods northeast of Cincinnati, Ohio. Quoting from his letter to us Mr. Lloyd says: "The Stylophorum has been collected and worked with the utmost care and no foreign substance is present in it. It was inspected piece by piece and you can use it with confidence."

METHOD OF EXTRACTION.

The drug in No. 20 powder was first thoroughly moistened with about five per cent. ammonia water for the purpose of liberating the bases from the acids with which they were combined in the plant, and then spread out in thin layers to dry at ordinary temperature. For the extraction a copper apparatus based upon the Soxhlet principle and of about 25 pounds' capacity was employed. Chloroform was the solvent used, and extraction continued until a portion of the liquid drawn from the bottom of the percolator did not, after the usual manipulation, respond to the test for alkaloids. The chloroform was recovered from the percolate and the waxy, dark-colored residue repeatedly digested with water acidulated with acetic acid upon the steam bath until exhausted of its alkaloid. The combined reddish, transparent filtrates contained the total alkaloids as acetates.

The chloroform held by the marc was entirely recovered by passing high pressure steam in at the bottom of the percolator, condensing the mixed vapors of water and chloroform, and separating the two layers. The hot marc was at once percolated with distilled water for the purpose of extracting the soluble salts naturally existing in the drug, as well as the ammonium salts of the acids originally combined with the bases. The aqueous percolate was concentrated to small volume, ten per cent. of alcohol added for preservation, and set aside for later study.

The red solution of the acetates of the bases was made alkaline with ammonia water, whereupon a very bulky, grayish precipitate was thrown down. This was collected on a large Buchner filter and thoroughly washed with water. The filtrate was now golden-yellow in color instead of red, thus showing that the red color body is precipitated with ammonia. This indicates the presence of a base allied to the red salt-forming alkaloid of Sanguinaria, Chelidonium, and Bocconia. The yellow color of the filtrate also indicates the presence of a color body other than the yellow salt-forming alkaloid found in the allied plants. The yellow filtrate, as

* Arch. der. Pharm. *228*, 96.

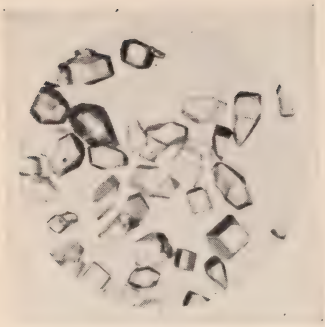

FIG. 1.—CHELIDONINE.
$C_{20}H_{19}NO_5.H_2O$

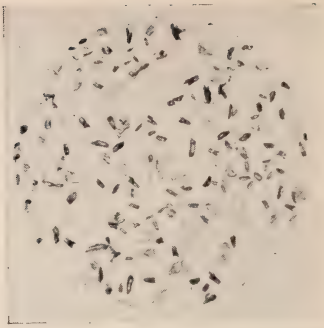

FIG. 2.—CHELIDONINE HYDROCHLORIDE
$C_{20}H_{19}NO_5.HCl.$

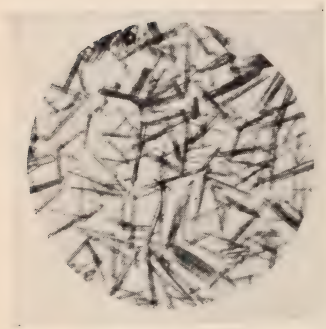

FIG. 3.—STYLOPINE.
$C_{19}H_{19}NO_5.$

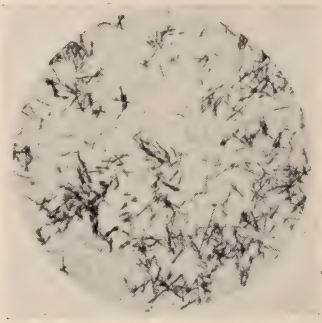

FIG. 4.—STYLOPINE HYDROCHLORIDE.
$C_{19}H_{18}NO_5.HCl.$

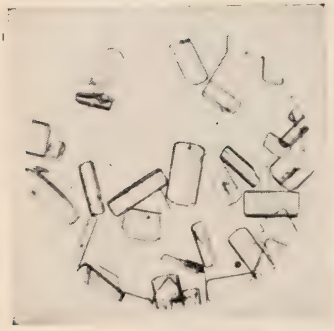

FIG. 5.—PROTOPINE.
$C_{20}H_{19}NO_5.$

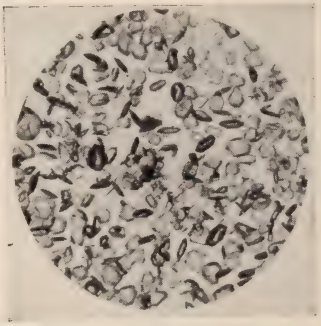

FIG. 6.—DIPHYLLINE.

well as all filtrates from similar operations, as long as they possessed considerable color, were reserved and worked later for the color body.

The alkaloids were redissolved in a small amount of glacial acetic acid to the usual bright red solution, diluted with water, re-precipitated with ammonia and washed as before. This operation for preliminary purification was repeated a number of times until the precipitate was nearly white.

ISOLATION OF THE ALKALOIDS.

Successive convenient portions of the alkaloid were dissolved in acetic acid, placed in a separator, about an equal volume of ether added, and then ammonia to alkaline reaction. If not too much alkaloid be taken, a moment's vigorous shaking causes complete solution of the bases in the ether, which takes on a bluish fluorescence. Solution is only temporary, however, so that separation and filtration through a tuft of cotton must be rapidly made to avoid premature crystallizaton. We have found wide-mouthed Erlenmeyer flasks of different sizes admirably suited for crystallizing, since undue loss of ether is avoided, and the alkaloid does not creep up the sides of the dish. Generally the alkaloid begins to separate from the filtered solution in a very short time, and sometimes even before it can be drawn from the separator. After no visible increase in crystallization takes place (generally after several hours) the supernatant ethereal solution, if it be practically colorless, is at once used again to shake out another portion of alkaloid, but if it be colored, the ether is recovered by distillation, dried, and then used over again. If, after several hours' standing, no crystals separated from a colorless, or nearly colorless, solution, it was concentrated to small volume, and again set aside to crystallize. The entire alkaloid was treated in this manner, and all the filters and cotton plugs thrown into a waste jar for later recovery. The strictest economy was observed with the alkaloids, so that we can say that practically none was lost.

It was noticed that crystals of two distinct forms would separate, sometimes both together, sometimes one form alone, and then again the other. The predominating alkaloid separated in the form of monoclinic prisms (Fig. 1), while the second crystallized in needles (Fig. 3). By close watching these two forms could be completely separated by fractional crystallization. The different fractions of the former alkaloid melted from 130° to 134° C., and of the latter, from 197° to 200°C., both, of course, in the unpurified state.

By a continuous repetition of the above process of dissolving in acetic acid, precipitating with ammonia and shaking out with ether extending over a period of fully three months, the entire alkaloidal product was worked up. All fractions of the prisms were united as well as those of the needles. As the work progressed most of the inert matter was removed in the form of an amorphous powder which separates at the contact of the two liquids, since it is insoluble in water and in ether.

A very interesting and peculiar property of the principal alkaloid, which we shall see later is identical with chelidonine, was accidentally discovered while scraping a large fraction of crystals from the sides of the crystallizing flask with a glass rod. As the rod rubbed against the crystals, the faces seemed to reflect light to an unusual extent; consqeuently, the phenomenon of "triboluminescence"* suggested itself. The experiment was repeated in a perfectly dark room with greater success, an intense light being emitted as the crystals were crushed. This is in some way connected with the crackling or snapping sound which we often heard coming from flasks in which very active crystallization was taking place. Whether an actual break in the crystals took place, we cannot say. A solution in which an active growth of crystals of this particular alkaloid was taking place, was set in a dark room and watched for some time. Each crackling sound spoken of was accompanied by a feeble spark. When a flask containing large crystals was placed in the palm of the hand, the body heat was sufficient to produce the sound, as well as the light. The same result was obtained when a flask of crystals was given a rotary motion. If a flask containing dry crystals be moderately shaken, the impact of the crystals against the side of the flask produced hundreds of intensely bluish-white scintillating sparks. These were best obtained with crystals from ether, not so well with those from chloroform or alcohol, or from mixtures of them. Covered with water, ether, or benzene, the effect is produced equally well. By shaking a flask of dry crystals close to the face of a sensitive plate covered by a negative, a positive was obtained with very short exposure. Other experiments are under way, and will be reported upon later, but we are of the opinion that electricity of cleavage is the phenomenon manifested. Since of all the alkaloids of Stylophorum this one alone possesses this feature, it served as an excellent identifying characteristic in the isolation.

In the later ethereal mother liquids three other alkaloids were separated by a very tedious and monotonous routine of fractional crystallization. These five alkaloids, all of which were obtained by the above method of isolation with ether as a solvent, we designate by the numerals I, II, III, IV, V. Alkaloid V was the last to be isolated, because of its extreme solubility in ether, but its identity was practically established early in the process, as was stated above.

ALKALOID I.

By far the greater portion of the total basic product consists of this alkaloid. Purification was effected as follows: The total product was dissolved in dilute sulphuric acid and treated with an excess of strong hydrochloric acid. The salt began to separate in a very short time in the form of a coarsely-crystalline powder. (See Fig. 2.) After collecting on a filter it was dissolved in boiling water, rapidly filtered through a tuft of cotton, the

* Wiedemann, Annal. d. Phys. u. Chem., *34*, 446; Ber. d. d. Chem. Ges., *34*, 1820.

solution cooled with ice-water and stirred to granulation. This was repeated at least ten times, or until the hydrochloride became white. The combined filtrates were treated in a similar manner. A portion of the hydrochloride dissolved in water, converted into the free base and shaken out with ether, soon yielded crystals that melted at 136° C. uncorr. The remainder of the salt was so treated, then recrystallized several times from hot alcohol, and finally from a mixture of chloroform and alcohol. From the latter mixture large crystals fully a quarter of an inch long were easily obtained which melted at exactly the same point as before. From its melting point, crystalline form and behavior with solvents there is no question in our minds that this, the principal alkaloid of Stylophorum, is chelidonine.

Chelidonine has as yet been found in only one other plant, viz.: Chelidonium majus. It was first isolated by Godefroy,* but in an impure state. Probst† was the first to obtain it pure and to study some of its properties. At about the same time Reuling‡ published a short article upon this base, but did not add much to the existing knowledge. A few years later Polex§ concerned himself with the alkaloid and obtained it in a pure state. Eykman‖ contributed an article upon chelidonine, but it was separated from Chelidonium majus and not from Stylophorum diphyllum. He did not arrive at definite conclusions regarding the composition, however. Henschke¶ made a close study of chelidonine, likewise from Chelidonium. Schmidt and Selle** are the only ones who have published accounts of work done upon the alkaloids of Stylophorum.

There exists in literature considerable discrepancy regarding the composition of this alkaloid. Will†† made combustions and calculated the formula $C_{40}H_{40}N_6O_6$ an expression that was variously interpreted as follows: Gerhardt‡‡ $C_{40}H_{19}N_3O_6$, Gmelin§§ $C_{42}H_{19}N_3O_6$, Löwig‖‖ $C_{40}H_{20}N_3O_6$, Limpricht¶¶ $C_{19}H_{17}N_3O_3$. Henschke, Schmidt and Selle succeeded in obtaining concordant results and a formula $C_{20}H_{19}NO_5.H_2O$. We believe that much of the difficulty encountered in the determination of the formula of this substance is due to the fact that purification is not easily effected.

Having prepared a considerable quantity of chelidonine from Stylophorum, we took up its study principally for the purpose of verifying the very latest results upon the composition.

For the determination of water of crystallization a small quantity of the freshly crystallized alkaloid was heated in an air-bath at a temperature of

* Journ. de Pharm., Dec., 1824.
‡ Annal. d. Chem. *29*, 131.
‖ Rec. d. Trav. Chim. *3*, 190.
** Arch. der Pharm. *228*, 96.
‡‡ Traité, *4*, 210.
‖‖ Lehrbuch, 1846.
† Annal. d. Chem. *29*, 113.
§ Arch. der Pharm. *16*, 77.
¶ Arch. der Pharm., *226* 624.
†† Annal. d. Chem. *35*, 113.
§§ Handbuch, IV, 1534.
¶¶ Lehrbuch, 1862.

100° C. to constant weight. Henschke used heat of 125° C., but with this temperature our product became gradually darker. Since neither Henschke nor Selle make mention of this in their report, we were of the impression that our product must still be contaminated with impurities, therefore, the colorless alkaloid was recrystallized twice from alcohol and again heated, but with the same result. Then a lower heat was tried and sufficiently prolonged to cause an appreciable loss of water, but again with the same change in color. Fearing that this coloration indicated a slight decomposition and therefore would vitiate results, an attempt was made to remove the water in a vacuum desiccator over sulphuric acid and phosphoric anhydride until the substance lost no weight.

A vacuum was maintained (with interruptions for weighing) for fully a month, and it was noticed as increasing quantities of water were removed the alkaloid became more yellow. Unfortunately, we could not complete the experiment because of an accident, but it was plainly evident that with removal of water of crystallization, even in the cold, discoloration takes place. Since light seems to hasten the change, there is in progress at this time an experiment to determine whether all the water is removed, and also whether discoloration takes place in the dark.

A sample heated to constant weight at 100° C. for about fourteen hours lost 4.5 per cent. of its weight. According to the formula $C_{20}H_{19}NO_5.H_2O$, the theoretical amount of water is 4.8 per cent.

Several combustions were made with the air-dried material as well as with that dried to constant weight, but the results were not as concordant as was desired and were therefore rejected. Excellent results were obtained with the nitrate, which is easily made pure and which contains no water of crystallization. In the estimation of the acid in the hydrochloride by means of silver nitrate the filtrate from the precipitated silver chloride separated large needles of the nitrate of chelidonine. After recrystallizing several times from hot water and drying in a desiccator, the following results of the combustions were obtained :

I..... .333 chelidonine nitrate gave .7044 CO_2 and .1524 H_2O.
II.. ..... .350 chelidonine nitrate gave .1532 H_2O.
III..... .317 chelidonine nitrate gave .6738 CO_2 and .1354 H_2O.

I.	II.	III.
C. 57.69		57.63
H. 5.08	4.86	4.74

Calculated for $C_{20}H_{19}NO_5.HNO_3$.
C. 57.69
H. 4.84

Nitrogen was determined by the Dumas as well as by the Kjeldahl method. By the former method the following results were obtained :

I... .4926 of anhydrous chelidonine gave .02118 of nitrogen = 4.27 per cent.
II... .551 of anhydrous chelidonine gave .022 of nitrogen = 3.97 per cent.
Theory = 3.96 per cent.

By the latter method the following results were obtained:

I..... .412 of chelidonine gave 3.33 per cent. of nitrogen.
II..... .486 of chelidonine gave 3.4 per cent. of nitrogen.
Theory = 3.77 per cent.

The hydrochloride was prepared and purified as stated above. Air-dried material heated in an oven for several hours did not lose weight; therefore, there is no water of crystallization. The acid was determined in the customary way with silver nitrate and weighing the washed and dried silver chloride.

I. .455 of chelidonine hydrochloride gave .1656 AgCl = 9.22 per cent. HCl.
II. .3406 of chelidonine hydrochloride gave .1264 AgCl = 9.4 per cent. HCl.
Calculated for $C_{20}H_{19}NO_5.HCl$.
HCl = 9.36 per cent.

The analyses of the gold and platinum double salts verified the formula obtained from combustions of the nitrate. The gold salt was readily made by precipitating a hot acid solution of the hydrochloride of chelidonine with an excess of a 2 per cent. solution of gold chloride. The double salt separated as a voluminous, orange-red precipitate, which was collected on a filter, thoroughly washed and dissolved in hot alcohol. Beautiful violet-red crystals, bunched in rosettes, separated in a short time, and these were recrystallized and dried in a desiccator. Heating in an oven, at 100° C., for several hours, did not cause it to lose weight.

I. .0774 of the gold salt yielded upon incineration .022 Au = 28.42 per cent.
Calculated for $C_{20}H_{19}NO_5.HCl.AuCl_3$.
Au = 28.21 per cent.

The platinum salt was made in the same manner, using a 5 per cent. solution of platinum chloride. The double salt separated as a yellowish precipitate which became denser and deeper-colored when reprecipitated for purification. We did not succeed in obtaining crystals for this compound from ethyl or methyl alcohol. One small fraction that had been standing in methyl alcohol for several days, had changed to fine silky needles, but we were not able to repeat the operation. Heat of 100° C. to constant weight removed 3.4 per cent. H_2O.

I. .136 of the water-free double salt left upon incineration .0236 Pt. = 17.4 per cent.
Calculated for $(C_{20}H_{19}NO_5.HCl)_2PtCl_4.2H_2O$.
Pt = 17.45 per cent.
H_2O = 3.1 per cent.

Action of ethyl iodide.

5.000 of pure dried material were heated in a bomb tube with an excess of pure ethyl iodide at 130°–140° C. for four hours. When cold the tube was opened and only a slight pressure noticed. In the bottom of the tube

there was an insoluble portion yellowish in color and above it a transparent light red liquid. The excess of ethyl iodide was driven off and the residue dissolved in boiling alcohol. It was filtered and set aside in a small Erlenmeyer flask. While crystals began to appear after a considerable length of time, we found that layering with an equal volume of ether as employed by Henschke hastened crystallization materially. Tufts of fine silky needles formed on the side of the flask and at the contact of the two liquids. Successive crops were obtained, all the fractions combined and recrystallized from the same solvents several times, but with loss of considerable material. Enough was left however to determine the iodine content with silver nitrate. The new compound was found to be free of water of crystallization.

I. .2038 of the compound gave .0948 AgI = 24.8 per cent. I
Calculated for $C_{20}H_{19}NO_5.C_2H_5I$
I = 24.94 per cent.

Long contact of potassium hydroxide upon this compound had no effect, since the same compound with identical melting point was again obtained in almost quantitative amount. This alkaloid is doubtless a tertiary base as was shown by Henschke.

For the determination of methoxyl groups a modification of Zeissel's well known method was employed, using ground glass joints throughout the entire apparatus. After carrying on the operation for fully an hour not the least turbidity was noticed in the silver nitrate solution. Methoxyl groups are therefore absent.

By pouring a solution of the sulphate of chelidonine into a large excess of Wagner's reagent an abundant chocolate-colored precipitate formed, which upon shaking vigorously became denser and settled to the bottom The collected precipitate was thoroughly washed and then dissolved in hot methyl alcohol and set aside in flat crystallization dishes. Two distinct forms separated, one in light red needles and the other in almost black prisms. These were separated mechanically and each recrystallized several times from hot methyl alcohol. When dried in a desiccator and the iodine in the light red crystals estimated with thiosulphate solution, figures were obtained that agree with the formula for the tri-iodide $C_{20}H_{19}NO_5.HI.I_3$. The black prisms appear to have the formula $C_{20}H_{19}NO_5.HI.I_5$.

Finally a solution of the free alkaloid chelidonine dissolved in absolute alcohol gave an optical rotation of $[\alpha]D = +115°24'$.

ALKALOID II.

This is second in abundance and crystallizes in distinct needles as shown in figure 3. The needles which Selle* obtained in such small

* Arch. der Pharm. *229*, 108.

quantity that only the melting point (193°–195° C.) could be made are probably the same substance. Since we have not found in literature anywhere a description of an alkaloid possessing the properties of this one we have decided to designate it by the name *stylopine*. All the fractions of the needles melting in the neighborhood of 200° C. were united and purified in the same manner employed with chelidonine. A pure product was obtained that possessed the constant melting point of 202° C. uncorr.

This alkaloid is almost insoluble in hydrochloric acid, forming fine needles of the salt (Fig. 4) when strong hydrochloric acid is added to a solution of the acetate. It is also insoluble in sulphuric acid, which serves excellently as a means of separation from chelidonine. The free alkaloid is very soluble in glacial acetic acid, much less so in dilute acid. The nitrate separates from aqueous solutions in very fine clusters of needles which in mass appear almost jelly-like, or gelatinous.

Precipitates were obtained with well-known reagents as follows:

Tannic acid	slight, white.
Potassium bismuth iodide	light yellow flocculent.
Potassium cadmium iodide	white.
Bromine water	yellow.
Phosphotungstic acid	white.
Potassium iodide	white needles.
Phosphomolybdic acid	dirty white.
Gold chloride	salmon to yellow ochre.
Platinum chloride	white to pale yellow.
Picric acid	deep lemon yellow.
Potassium dichromate	yellow.
Wagner's reagent	chocolate brown.

The free alkaloid contains no water of crystallization. Combustions of the pure dry substance gave the following results:

I.	.1926 stylopine gave .4712 CO_2 and .0958 H_2O.
II.	.1718 stylopine gave .0864 H_2O.
III.	.1704 stylopine gave .4206 CO_2 and .0854 H_2O.
IV.	.2714 stylopine gave .6680 CO_2.

Four nitrogen determinations gave the following results:

I.	.1768 stylopine gave .007478 nitrogen.
II.	.177 stylopine gave .007292 nitrogen.
III.	.1824 stylopine gave .00698 nitrogen.
IV.	.1316 stylopine gave .005578 nitrogen.

Found.	I.	II.	III.	IV.
C	66.72	....	66.78	67.10
H	5.52	5.58	5.57	
N	4.23	4.12	3.83	4.24

Averages of results.	Calculated for $C_{19}H_{19}NO_5$.
C 66.86	66.83
H 5.55	5.54
N 4.10	4.10
O 23.49	23.46

The hydrochloride was made in the usual manner and purified by recrystallization from hot water. It contains no water of crystallization. For the determination of the formula of this salt the acid was estimated by precipitating with silver nitrate and weighing the washed and dried silver chloride. Only one estimation was made.

I. .0524 of the hydrochloride of stylopine gave .020 AgCl = 9.7 per cent. HCl.
Calculated for $C_{19}H_{19}NO_5.HCl$.
HCl = 9.65 per cent.

The platinum salt was made by precipitating a hot acid solution of the hydrochloride with a 5 per cent. solution of platinum chloride. The precipitate was light yellow at first, but became darker after a second precipitation for purification. It contains no water of crystallization.

I. .0406 of the platinum salt gave upon incineration .0074 Pt=18.2 per cent.
II. .0156 of the platinum salt gave upon incineration .0028 Pt=17.9 per cent.
Calculated for $(C_{19}H_{19}NO_5.HCl)_2.PtCl_4$.
Pt=17.7 per cent.

Action of ethyl iodide.

Two grams of the pure alkaloid were heated in a hard glass tube with an excess of freshly prepared ethyl iodide at 130° C. for about two hours. Even in the cold the change begins to take place, but heating is required to complete it. The new compound in the tube became slightly yellow in color and was decidedly more voluminous than the original alkaloid. After cooling, the tube was opened and the excess of the ethyl iodide removed by distillation. The residue was then dissolved in boiling alcohol and when cold layered with ether and set aside in a flask to crystallize. The successive small crops were all united and again dissolved in alcohol and set aside as before. The new compound, consisting of small clusters of fine needles, melts at 255° C. The iodine content was determined in the usual manner.

I. ..... .1062 of the double salt gave .0486 AgI = 24.7 per cent. I.
II. ..... .1086 of the double salt gave .050 AgI = 24.8 per cent. I.
Calculated for $C_{19}H_{19}NO_5.C_2H_5I$.
I = 25.5 per cent.

Potassium hydroxide is without action upon this compound. We have here also probably a tertiary base, though experimental proof is not complete.

A modification of Zeissel's method was employed for the determination of methoxyl groups, but not the least turbidity was noticed in the silver

nitrate solution, so that we must conclude that these groups do not exist in this base.

For the determination of hydroxyl groups a small quantity was heated in a flask with acetic anhydride and sodium acetate under a reflux condenser for several hours. A slight change in color of the solution took place. When the liquid was poured into cold water many small, oily drops separated which after a time collected on the side of the dish in the form of a varnish which possessed a disagreeable odor. Repeated trials to secure crystals from this varnish were without result, and as the material was so small in quantity we abandoned this part of the work until a larger quantity is available. Crystalline periodides are easily obtained by the usual method, but here too because of scarcity of material no analyses could be made.

Potassium iodide throws down a white precipitate of fine needles from a solution of stylopine in acetic acid. Not enough material was at hand to make duplicate determinations of the iodine, but the probabilities are that the compound has the formula $C_{19}H_{19}NO_5.HI$.

The pure alkaloid dissolved in absolute alcohol rotates polarized light $[\alpha]D = -315^\circ\ 12'$.

ALKALOID III.

This alkaloid is probably third in abundance in the plant, but only a small portion was obtained from the original total product for the reason, as we shall see later, that it is to some extent soluble in ammonia. In the separation of the two alkaloids already described, this one made its appearance in only one or two fractions in an almost uncontaminated condition. Small white warts, and colorless transparent prisms were about equally abundant in these fractions. Protopine was at once suspected, and from the melting-point of 203° C. in the unpurified condition and its characteristic color reaction with sulphuric acid and Erdmann's reagent, our suspicions were practically confirmed.

It will be recalled that the alkaline aqueous liquids that had been washed with ether for the removal of alkaloids were reserved as long as they possessed a yellow color. After acidulating this liquid with acetic acid and concentrating to smaller volume it was found that a curdy precipitate was thrown down with alkali. This was shaken with ether and the dissolved alkaloid filtered into a flask and set aside. In a very short time both warts and prisms separated, which turned out to be protopine. (Fig. 5.) All fractions of this alkaloid were united and purified in the usual manner, and finally, recrystallized from a mixture of alcohol and chloroform. The rather large prisms of protopine melted at 204°–205° C. uncorr.

To make doubly certain that this alkaloid was protopine one combustion was made:

.4203 alkaloid gave .0467 CO_2 and .196 H_2O.

Found.	Calculated for $C_{20}H_{19}NO_5$.
C.. 67.92	67.98
H.. 5.23	5.38

It contains no methoxyl groups as determined by Zeissel's method.

A periodide was obtained which crystallized in beautiful rosettes of a wine-red color. The formula was not determined, because of lack of sufficient material.

ALKALOID IV.

This base is present in very small quantity, and was obtained with great difficulty during the long course of fractional crystallization. It generally separated out along with chelidonine, but the relative quantity was so small that complete separation consumed nearly as much time as the isolation of all the other alkaloids. The mixed fractions of chelidonine and this alkaloid were dissolved in acetic acid, diluted with water, placed in a separator, made alkaline with ammonia, and shaken out with ether. After filtering into a flask, close watch was kept of the progress of crystallization, and as soon as a small quantity of crystals had separated, the ether was decanted into another flask, and just as carefully watched for the appearance of further crystals. This was repeated over and over again, until about twenty-five small fractions were obtained that melted in the neighborhood of 210° C. These were combined, and the process of purification fairly begun, when we lost about two-thirds of the product by an accident. Enough was saved, however, to observe some of its properties. The perfectly pure alkaloid melts at 216° C. uncorr. It crystallizes at times in extremely thin plates, and from their position on the side of the flask reminded us of wings of butterflies. The most common form is shown in Fig. 6.

The acetic acid solution behaved with the usual alkaloidal reagents practically in the same manner as stylopine, with the exception that the hydriodide formed by the addition of potassium iodide is amorphous instead of crystalline.

Color tests were made as follows:

A few drops of a solution of the free alkaloid were placed in each of the concave depressions of a white porcelain testing plate and evaporated on the water-bath to dryness. In this way a very thin film of the alkaloid is distributed over the surface of the depression. A drop of the reagent was let fall into the cavity, and brought in contact with the alkaloid.

Nitric Acid—Slowly dirty yellow, then passing through violet, wine red, dull green and finally reddish brown.

Marquis' Reagent—First violet blue then wine red.

Erdmann's Reagent—Yellowish green to bright green.

Froehde's Reagent—Deep green, olive green bordered with blue, finally all becoming blue.

Since this alkaloid seems not to have been found before, we have named it *diphylline*.

ALKALOID V.

In acid solutions this alkaloid is bright red in color but is precipitated

pure white with alkalies. The free alkaloid is extremely soluble in ether, more so than any of the others, which accounts for the fact that it is the last to crystallize out. The bluish fluorescent ethereal liquid, from which the four alkaloids mentioned had been eliminated because of their insolubility in ether, was treated with dry hydrochloric acid gas for an hour. The bright red salt collected on the exit tube and on the bottom and side of the bottle. The ether was decanted and the red salt dissolved in hot water, cooled to just short of the crystallizing point, made alkaline with ammonia water, and shaken out with ether. The filtered ethereal solution was set aside in a vacuum desiccator over night. By morning almost white clusters of plates had separated that on exposure to air soon began to turn red. Not over .300 gram. were obtained, so that no analyses were attempted. This is without question the alkaloid which Schmidt and his pupils have named sanguinarine. For historical as well as etymological reasons it should be called chelerythrine, but we shall not add to the existing confusion by applying the names differently.

ORGANIC ACIDS.

The organic acids which were in combination with the alkaloids in the original drug are contained in the aqueous percolate of the marc in the form of ammonium salts. By the addition of strong alcohol most of the extraneous matter is removed in the form of a sticky mass. Convenient portions of the percolate were treated in a five-liter flask with successive portions of 96 per cent. alcohol until the precipitate which formed balled together into a gummy mass upon vigorous shaking, leaving the supernatant liquid light colored and almost transparent. The latter was filtered into a 20-liter ice jar and set aside in a cool place. After a few hours very light, fluffy, hemispherical masses of fine needles began to separate on the side of the jar. By adding more alcohol from time to time these masses grew enormously, and the solution finally became practically exhausted of this crystalline substance. The liquid was siphoned off and the crystals removed with a spatula, and what at first appeared to be a large yield was compressed to small volume. These crystals were found to consist of a potassium compound extremely soluble in water, practically insoluble in alcohol. No odor of ammonia could be detected when a portion was boiled with strong potassium hydrixide solution.

Several methods for the purification of this compound were tried, but the following was found to be most satisfactory: Since this compound forms an insoluble lead salt the aqueous solution of the entire yield was precipitated with a solution of lead acetate. The white granular precipitate was collected on a filter and washed until the filtrate scarcely gave a test for lead. The lead salt was suspended in water and decomposed with hydrogen sulphide. After warming the lead sulphide was removed by filtration and the filtrate which contained the free acid warmed slightly to

remove excess of hydrogen sulphide. To this solution precipitated calcium carbonate was added until there was no more effervescence, the whole being kept hot. The nearly colorless filtrate was set aside and at the end of several hours a magma of fine needles of the calcium salt had separated. By recrystallizing several times from hot water the salt was obtained nearly pure white. The latter was brought into aqueous solution again and treated with a slight excess of silver nitrate solution, which threw down pure white needles of the silver salt. This was collected on a filter, washed, dissolved in hot water and treated with hydrochloric acid. The filtrate upon cooling separated a mass of silky needles of the free acid. Several recrystallizations furnished a pure product. It is very sour and forms salts with a number of bases.

Since Stylophorum diphyllum is so closely related to Chelidonium majus, botanically, we suspected that this acid is the same as the one found in the latter plant and named chelidonic acid by Probst. The characteristic yellow color of the potassium salt of chelihydronic acid obtained when potassium hydroxide is added in excess to chelidonic acid, is also produced with our acid. A combustion was made of the desiccator-dried material and the following results obtained:

.246 of the acid gave .3748 CO_2 and .0658 H_2O.

Found.	Calculated for $C_7H_4O_6+H_2O$
C .. 41.55	41.58
H.. 2.97	2.97

Since chelidonic acid has been so thoroughly investigated by Lerch* and others, we have contented ourselves with mere identification.

The alcoholic liquid that had been deprived of potassium chelidonate was distilled in vacuo for the recovery of the alcohol and the aqueous residue remaining concentrated to small volume. The inert matter was removed with alcohol as before. The filtrate was set aside, and, after many days, fine needles separated and projected from the side of the jar. These were removed, purified, and found to be the ammonium salt of chelidonic acid.

COLORING MATTER.

As was stated above, the filtered alkaline aqueous liquids from which the alkaloids had been washed by means of ether, were reserved for the purpose of isolating the coloring matter. The greater part of the protopine, alkaloid III.. was recovered from this solution. The liquid still retained its full depth of color, and was shaken out with several liberal portions of acetone. The deeply colored acetone solution was filtered, and the acetone removed by distillation. The dark, bitter residue was taken up with a small quantity of water, and treated with a solution of lead ace-

* Monatsh. f. Chem. *29*, 131.

tate. The precipitate was collected, and then boiled with water, which took out considerable of the coloring matter. The filtrate, after concentration, separated after several days small crystals of a yellowish-red color, which, when dissolved in water, imparted to it the color of the original solution. From analogy, we believe that this body is the same as Probst's chelidoxanthin, but the quantity was too small for further study. Some interesting questions have presented themselves in connection with this substance, which we hope to be able to answer in the near future.

SUMMARY.

Stylophorum diphyllum contains at least five alkaloids, as follows:

Chelidonine	$C_{20}H_{19}NO_5.H_2O.$	Melting point, 136° C. uncorr.
Stylopine	$C_{19}H_{19}NO_5.$	Melting point, 202° C. uncorr.
Protopine	$C_{20}H_{19}NO_5.$	Melting point, 204-205° C. uncorr.
Diphylline		Melting point, 216° C. uncorr.
Sanguinarine		
Chelidonic acid	$C_7H_4O_6+H_2O.$	
Chelidoxanthin	(?)	

The study of this plant and its constituents will be prosecuted during the coming year, Prof. Lloyd having again arranged for the collection of a large quantity of authentic material. We take pleasure in extending to Prof. Lloyd our sincere thanks for his assistance, without which this investigation would not have been possible.

We also take this opportunity of expressing our appreciation of the generosity of Messrs. F. Stearns & Co. for furnishing the funds necessary for the promotion of the work.

School of Pharmacy, University of Michigan, Ann Arbor, Mich.

Mr. Lloyd's presentation of the subject was applauded.

There was no discussion on the paper, and on motion both papers of Mr. Schlotterbeck were referred for publication. Mr. Scoville then presented in abstract the following:

THE SEPARATION OF CINCHONA ALKALOIDS WITH ETHER.

BY WILBUR L. SCOVILLE.

For purposes of assay, cinchona bark contains five alkaloidal bodies, namely, quinine, quinidine, cinchonidine, cinchonine, and a group known as amorphous alkaloids.

Other alkaloids may be found, but they are either very closely related both chemically and physiologically to one of the above, or else are peculiar to certain varieties of bark. Even the separate estimation of the above given bodies is considerable of a process, and beyond the demands of ordinary pharmeceutical usage.

Of the above group, quinine and quinidine are the most active therapeutically, cinchonidine is next in importance, and cinchonine and the

amorphous alkaloids are relatively feeble. These last (amorphous alkaloids) usually are found only in very small proportions, but cinchonine may constitute 60 or more per cent. of the total quantity of alkaloids present, or it may constitute less than ten per cent. of the whole. Quinine is commonly found in considerable proportion, with quinidine small, but occasionally the latter predominates. A sample of bark has been reported to contain 4.07 per cent. of quinine in a total of 6.97 per cent. It is therefore evident that an estimation of total alkaloids even with a separation of quinine may be misleading, and not correctly indicate the true value of the bark.

Of the above groups, quinine, quinidine and cinchonidine are soluble in ether, while cinchonine and the amorphous alkaloids are but slightly soluble. It was for the purpose of ascertaining to what extent the first three could be separated from the others by ether, and its applicability for assay purposes that the following experiments were undertaken.

There has been but little written upon the action of ether upon mixtures of cinchona alkaloids, and the investigation had no precedents to follow.

To detail all the work would be tedious. The first step was to find the most practical and ready method of applying ether to the alkaloids. The precipitation, collection and drying of the alkaloids as obtained from the bark by the usual assay methods was found impracticable.

There is a tendency of the mixed alkaloids to clot together upon precipitation, necessitating the subsequent powdering of the alkaloids before treating with the ether. Various forms of alkali were tried, but even pouring the acid solution of the alkaloids upon a large excess of sodium bicarbonate only partially prevented the clotting. Then in some instances the filtration was very slow and tedious. In one instance three days were required to filter about 40 Cc. of fluid through a 7 cm. filter paper, and then the filtrate was not clear. Add to this the fact that the alkaloids begin to melt at temperatures below 60° C., and it will be seen that for ordinary processes of assay it is impracticable to attempt to apply ether to the dried and powdered alkaloids after separation from the other constituents of the bark.

Moreover it was found that by shaking the ether thoroughly with an alkaline aqueous fluid, the action of the ether was just as efficient as when employed upon powdered alkaloid.

No difference was observed between ammonia, caustic soda or potassa or sodium carbonate as the precipitant, so far as the extraction of alkaloids by the ether was concerned.

The next step was to learn the quantity of ether necessary for the extraction of an average amount of quinine, quinidine and cinchonidine from a mixture with cinchonine.

As a preliminary to this work it was found necessary to purify some

quinine sulphate, the commercial salt containing too much cinchonidine to be usable. Some of the commercial sulphate was recrystallized five times from water, and was then found to respond easily to all the official tests for purity. The quinine, when separated as a free alkaloid, was also found to be readily soluble in ether.

Commercial samples of quinidine sulphate, cinchonidine sulphate and cinchonine sulphate were obtained which responded to the U. S. P. tests for purity, and were used as obtained.

Inasmuch as commercial ether contains an appreciable proportion of alcohol, it was also desirable to ascertain what influence this might have upon the results. Most of the succeeding tests were, therefore, carried out with anhydrous ether, having a specific gravity of 0.7201, and with ether containing alcohol and having a specific gravity of 0.7250 and one of 0.7285, the latter being slightly above the limit set by the U. S. Pharmacopœia—0.7280.

A series of experiments was then made upon the following mixtures o alkaloids, the following quantities being employed in each experiment:

Quinine	0.300
Quinidine	0.020
Cinchonidine	0.150
Cinchonine	0.150
Total	0.620
Total ether-soluble	0.470

This mixture in acid solution, amounting to 10 to 30 Cc. of fluid in different experiments, was placed in a 250 Cc. globular separator and an excess of alkali added—either ammonia water, sodium carbonate, or potassa solution. After standing for a few moments in order that any heat from the reaction between the acid and alkali might be dissipated, ether was added and the whole shaken vigorously for five minutes or more, the upper orifice of the separator being tightly closed with a cork. The separator was then allowed to stand two hours in order to allow the crystallizing of the cinchonine first dissolved by the ether, (freshly precipitated cinchonine being quite soluble in the ethereal solution, but crystallizes out on standing.) Then without removing the stopper, as much as possible of the lower, aqueous fluid was drawn off and the crystals of cinchonine again allowed to settle. The ether was then decanted from the neck of the separator, measured carefully and evaporated.

From the weight of alkaloids thus obtained (after drying at 105–110° C.) was calculated the quantity of alkaloids dissolved by the whole amount of ether employed.

The following results were obtained:

10 Cc. ether extracted:

Sp. gr. 0.720	Sp. gr. 0.725	Sp. gr. 0.7285
0.390	0.424	0.460
0.395	0.490	0.500
0.406	0.443	0.555
0.422	0.432	0.475
0.427	0.435	0.500
0.445	0.495	
Averages, 0.414	0.453	0.498

15 Cc. ether extracted:

Sp. gr. 0.720	Sp. gr. 0.725	Sp. gr. 0.7285
0.4837	0.5257	0.564
0.4267	0.4927	0.532
0.4530	0.507	0.543
0.4252	0.483	0.534
0.4537	0.5077	0.541
Averages, 0.4484	0.5032	0.543

20 Cc. ether extracted:

Sp. gr. 0.720	Sp. gr. 0.7250	Sp. gr. 0.7285
0.4873	0.5233	0.541
0.4820	0.540	0.560
0.531	0.5238	0.549
0.5252	0.541	0.5652
0.5184		
Averages, 0.5228	0.532	0.553

25 Cc. ether extracted:

Sp. gr. 0.720	Sp. gr. 0.725	Sp. gr. 0.7285
0.538	0.5506	0.577
0.540	0.5743	0.587
Averages, 0.539	0.5624	0.582

30 Cc. ether extracted:

Sp. gr. 0.720	Sp. gr. 0.725	Sp. gr. 0.7285
0.501	0.5388	0.5473
0.5064	0.5454	0.5577
0.5076		
Averages, 0.505	0.5421	0.5525

The significance of these figures, aside from the variability in results, may be more easily perceived if the average results are expressed in percentages of ether-soluble alkaloids extracted, as follows:

Ether.	Sp. gr. .720.	Sp. gr. .7250.	Sp. gr. .7285.
10 Cc. extracted.....	88.0 per cent.	96.4 per cent.	106. per cent.
15 Cc. extracted.....	95.4 per cent.	107.0 per cent.	115.5 per cent.
20 Cc. extracted.....	111.2 per cent.	113.9 per cent.	117.6 per cent.
25 Cc. extracted.....	114.6 per cent.	119.6 per cent.	123.8 per cent.
30 Cc. extracted.....	107.4 per cent.	115.3 per cent.	117.5 per cent.

It will be noticed that the apparent action of the ether is not propor-

tionate to its quantity, even within the limits of saturation with ether-soluble alkaloids. The figures appear even contradictory and, when the individual solubilities of the alkaloids are considered, impossible.

Thus quinine, of which there is 0.300 Gm. present, should require 9.51 Cc. of ether, of specific gravity .725, the quinidine 0.6 Cc., and the cinchonidine 14.48 Cc. more of the same ether, making a total of 24.59 Cc. of ether required to dissolve the quantities of the three alkaloids present. Yet 10 Cc. of this ether extracted nearly all these alkaloids, and 15 Cc. proved an excess.

There are two explanations possible. The first is that by the method employed, a slight loss of ether by evaporation will be multiplied in the final result and indicate more than is actually present. Thus a loss of 1 Cc. of ether by evaporation would be about doubled when 10 Cc. of ether was employed (because the average quantity of ether decanted was 4 to 5 Cc. less than was put on), and this gives a result 20 per cent. too high.

The above experiments were made during the very warm weather of June and July, when the thermometer was almost constantly above 80° F., and frequently above 90°. The conditions for error by evaporation were thus most favorable.

Confirmation of this error is also seen in the more constant and relatively lower results obtained as the quantity of ether is increased. And yet this error does not satisfactorily account for the fact that 5 Cc. of clear ethereal solution, for instance, upon evaporation yielded 0.2535 Gm. of alkaloids.

Another explanation is that ether does not possess the same solvent power upon a mixture of alkaloids as upon the same alkaloids separately.

In 1887, Dr. O. Hesse stated * that when a mixture of cinchonidine and quinine is treated with a quantity of ether insufficient to dissolve it all, a solution is obtained which contains the two alkaloids in the proportion of two molecules of cinchonidine to one of quinine, and is very soluble in ether. But when the concentrated ethereal solution is diluted with fresh ether, this combination is broken and the alkaloids become relatively less soluble.

In 1896, David Howard wrote † that "an ethereal solution of quinine will dissolve a proportion of cinchonidine considerably in excess of the normal solubility of that alkaloid in ether."

Again C. H. Wood and E. L. Barrett found that quinidine is more soluble in a solution of quinine than in ether alone. Admitting then, a not inconsiderable error in the above results as due to evaporation, it would appear that we must consider the influence of a compound solvent in which the solvent powers are modified by dilution. That the more

* Pharm. Journ. 1887, p. 519.

† Pharm. Journ. 1896, p. 506.

concentrated the solution, the greater is the solvent power of its constituents.

This theory was further tested in other mixtures in which the total quantities of alkaloids were kept the same, but the proportions were varied. These were treated in just the same way as the first mixture with different quantities of ether (15 to 40 Cc.) in all a little more than 50 separations, but the results were so similar to those reported above tha their detail will be here omitted to avoid tediousness.

More interesting, perhaps, will be the results obtained by treating mix tures of alkaloids made to represent actual assays of cinchona barks, as reported, with the exception that the reported quantities of cinchonine and amorphous alkaloids were combined as cinchonine in the tests. In all cases the quantity of amorphous alkaloids reported was less than 0.100 Gm.

It was my original intention to carry out a full series of experiments with each of the three ethers, but the supply of purified quinine gave out, and lack of time has prevented replenishing it and the finishing of the experiments before this date.

MIXTURE A.

Quinine	.275
Quinidine	.010
Cinchonidine	.136
Cinchonine	.084
Total	.505
Ether-soluble	.421

By the aliquot method 20 Cc. of ether used.

Sp. gr. of ether	.720	.720	.725	.725	.7285	.7285
Amount decanted	15.7 Cc.	15.9 Cc.	15.6 Cc.	15.7 Cc.	15.1 Cc.	15.3 Cc.
Weight obtained	.3525	.3675	.378	.3835	.3765	.389
Corrected weight	.4484	.4622	.4846	.4885	.4986	.5085
Per cent. obtained	106.5	109.7	115.1	116.0	118.4	120.7

Rinsing out the ether with 3 portions of 5 Cc. each fresh ether.

Sp. gr. of ether	.720	.720	.720	.720
Amount first used	30 Cc.	30 Cc.	40 Cc.	40 Cc.
Weight of alkaloids	.442	.442	.465	.470
Per cent. obtained	105.0	105.0	110.4	111.6

MIXTURE B.

Quinine	.290
Quinidine	.100
Cinchonidine	.068
Cinchonine	.527
Total	.979
Ether-soluble	.548

By the aliquot method 20 Cc. of ether used.

Sp. gr. of ether	.720	.720	.725	.725	.7285	.7285
Amount decanted	6.65 Cc.	7.7 Cc.	6.4 Cc.	8.35 Cc.	8 65 Cc.	
Weight obtained.....	.172	.184	.175	.2255	.2058	
Corrected weight.....	.5172	.4779	.5468	.541	.4781	
Per cent. obtained.....	112.0	104.3	119.3	118.1	104.3	

Rinsing out ether with 4 portions of 5 Cc. each fresh ether.

Sp. gr. of ether	.720	.720	.720	.720
Amount first used	30 Cc.	30 Cc.	40 Cc.	40 Cc.
Weight obtained	.4595	.....	.527	.519
Per cent. obtained....	100.0	.....	115	113.3

MIXTURE C.

Quinine	.413
Quinidine	.013
Cinchonidine	.090
Cinchonine	.080
Total	.596
Ether-soluble	.516

By the aliquot method, 20 Cc. ether used.

Sp. gr. of ether	.720	.720	.725	.725	.7285	.7285
Amount decanted	16.5 Cc.	16.65 Cc.	16.1 Cc.	16.4 Cc.	16.0 Cc.	16.45 Cc.
Weight obtained.....	.5132	.507	.5095	.5090	.5133	.514
Calculated weight	.622	.609	.6329	.6036	.6416	.6249
Per cent. obtained ...	120.5	116.0	122.6	117.1	124.3	121.1

Rinsing out ether with 3 portions of Cc. each of fresh ether

Sp. gr. of ether	.720	.720	.720	.720
Amount first used	30 Cc.	30 Cc.	40 Cc.	40 Cc.
Weight obtained	.5470	.5405	.5635	.5715
Per cent. obtained....	106.0	104.6	109.2	110.7

MIXTURE D.

Quinine	.247
Quinidine.....	.057
Cinchonidine.....	.204
Cinchonine	.409
Total	.917
Ether-soluble.....	.508

By the aliquot method, 20 Cc. ether used.

Sp. gr. of ether	.720	.720	.725	.725	.7285	.7285
Amount decanted	13.8 Cc.	12.9 Cc.	13.4 Cc.	11.6 Cc.	11.0 Cc.	10.65 Cc.
Weight obtained	.2892	.2695	.2930	.2608	.2610	.2548
Calculated weight	.4188	.4178	.4373	.4496	.4727	.4785
Per cent. obtained	82.4	82.2	86.0	88.7	93.0	94.1

Ether rinsed out with 4 portions of 5 Cc. each fresh ether.

Sp. gr. of ether	.720	.720	.720	.720
Amount first used	30 Cc.	30 Cc.	40 Cc.	40 Cc.
Weight obtained	.417	.429	.513	.4795
Per cent. obtained	82.08	84.4	101.0	94.3

MIXTURE E.

Quinine	.395
Quinidine	.007
Cinchonidine	.204
Cinchonine	.093
Total	.699
Ether-soluble	.606

Ether rinsed out with 3 portions of 5 Cc. each fresh ether.

Sp. gr. of ether	.720	.720	.725	.725	.7285	.7285	.720	.720	.720	.720
Amount first used	20 Cc.	20 Cc.	20 Cc.	20 Cc.	20 Cc.	20 Cc.	30 Cc.	30 Cc.	40 Cc.	40 Cc
Weight obtained	.5015	.498	.515	.5085	.5175	.5385	.567	.559	.638	.604
Per cent. obtained	82.5	82.1	84.9	83.9	85.3	88.8	93.4	92.2	105.2	99.6

MIXTURE F.

Quinine	.176
Quinidine	.034
Cinchonidine	.140
Cinchonine	.530
Total	.880
Ether-soluble	.350

Ether rinsed out with 4 portions of 5 Cc. each fresh ether.

Sp. gr. ether	.720	.720	.725	.725	.7285	.7285	.720	.720	.720	.720
Amount first used	20 Cc.	20 Cc.	20 Cc.	20 Cc.	20 Cc.	20 Cc.	30 Cc.	30 Cc.	40 Cc.	40 Cc.
Weight obtained	.2230	.248	.252	.266	.267	.259	.225	.225	.254	.261
Per cent. obtained	63.7	70.87	72.0	76.2	72.2	74.0	64.3	64.3	72.5	74.5

Of these six mixtures, three (A, C, and E) represent low percentages of total alkaloids but relatively high efficiencies. The others represent high percentages of total alkaloids but relatively low efficiencies. It is to be borne in mind that these are actual reported assays.

A noticeable result, seen also in the first experiments, is the remarkable coincidence with 20 Cc. and 30 Cc. of ether. In several cases there is apparently no difference between the amount of alkaloids extracted by

20 Cc. or 30 Cc. In the last mixture (F) the method employed, namely, rinsing out the original ether with fresh ether, eliminates any error by evaporation, and yet the results are almost identical. It is the more marked when there is more than 0.100 Gm. of cinchonidine present. A large proportion of cinchonidine also shows less relative difference with varying portions of ether.

An excess of cinchonine appears to have no marked influence upon the solvent power of the ether, but it bothers in a mechanical way. It may be that the low results of Mixture F. indicate that it reduces the solubility of cinchonidine, but there is no other evidence toward this.

When a considerable quantity of cinchonine is present it remains in the mother-liquor as a dense magma which occludes the ether.

This is shown in Mixture B. in the small quantities of ether which could be decanted. That the ether was held within the liquid mechanically, was shown by the fact that a continued poking of the liquid with a glass rod would liberate globules of ether from within the fluid, which would then rise to the surface. It is very likely that the low results obtained in Mixture F. are due, in part at least, to an insufficient rinsing with fresh ether.

The crystalline cinchonine also tends to float in the ether and makes decantation difficult and tedious.

In fact it is not easy to choose between the aliquot and the rinsing method for all combinations. The aliquot method is liable to the error of evaporation, but is much easier of manipulation, particularly when the cinchonine is in excess. The rinsing method avoids the first error, but is much more difficult of manipulation, and unless thoroughly done may cause as great an error in the opposite way.

The conclusions from these experiments are yet to be made. It is regretted that the effect of 50 Cc. of ether could not be tried, and also that the experiments could not be applied to a larger number of mixtures. It is my intention to continue the work in the near future.

I feel like apologizing for presenting to this body an unfinished paper, and results which are largely negative; but it was somewhat imperative that these results should be presented at the present time, and a discussion of the subject or a few suggessions from those present may justify this effort.

The question at present appears to be whether a process of assay of cinchona which gives results 20 or more per cent. from the truth, but which represent real therapeutic activity, is to be preferred to a process which gives truer results, but does not represent real therapeutic activity. Or is it necessary to go to the extent of a double assay by a tedious and delicate process?

The only clear conclusion to be drawn from the above experiments is that a moderate excess of ether gives results closer to the truth than a

deficiency, and that the separation of quinine alone by ether must be considered fallacious.

Also that the quantity of alcohol in the ether employed, as shown by its specific gravity, has a very important influence upon the results.

Boston, Mass., Sept. 1, 1901.

THE CHAIRMAN: Are there any remarks on this paper?

MR. LOWE: I think the ratio of medicinal activity of the alkaloids is, quinine 100, quinidine 90, cinchonidine 70, cinchonine 40. If this is correct, quinidine is almost as valuable as quinine.

MR. LYONS: A somewhat different result was obtained by the commission that studied this matter very carefully in India years ago, and established the relative values of these alkaloids. The result shown by its work was, quinidine 100, quinine 98, cinchonidine 95, and cinchonine about 90.

MR. LOWE: They say that figures won't lie, but they seem to have done so in this case.

MR. LYONS: In answer to the gentleman I will say, that the two sets of figures may possibly have been taken from the same report; the figures given by Prof. Lowe giving the relative doses required of the several alkaloids, while the figures that I give refer to the proportion of cases successfully treated.

MR. SEARBY; What was the date of that commission?

MR. LYONS: I do not remember. It was some years ago.

MR. SEARBY: There was an earlier commission that reported adversely as to the value of cinchonine, placing it far below the other three.

MR. LYONS: Of course, we would like to have the views of others who have worked on this subject, but it seems to me, all things considered, that it is better to adopt some standard that we recognize as cinchona bark—a bark rich in quinine; and a bark of that sort is one that will yield a large proportion of ether-soluble alkaloids. We might thus throw out a red bark that happens to contain a large proportion of cinchonine, but very little of the ether-soluble alkaloids. If we adopt total alkaloid as our standard, we will recognize the use of those barks that are cheap and commonly regarded as inferior.

The method of separation that this paper has in view—separation by shaking out the alkaloid with ether—is not the only way of separation. The method proposed by Dr. Gerdin deals with dry alkaloid, and does not involve the element of uncertainty which comes in when water is present. Made in this way, we obtain very concordant results, provided we use the official ether, which should contain about five per cent. of alcohol.

Mr. Searby moved to receive the paper with thanks, and refer to the Committee of Revision of the U. S. Pharmacopœia.

The Chair announced that the next paper was one upon the subject of Creosote, by Merck & Company, and that he would ask Mr. Remington to read it.

MR. REMINGTON: I think our Chairman is to be heartily congratulated upon the papers that he has brought out — from Berberine up to Quinine. I feel that we are going to get some good results from them. This is a paper for which my interest comes from the Pharmacopœial side of the question. Merck & Company, of New York, the well-known chemists, have sent me a paper in connection with Pharmacopœial

work on Creosote, and they wanted it presented to the Association at a general session. It was not suitable for that, however, and I spoke to the Chairman of this Section about it, and we agreed it would be best to present it here. It is not very long, and with your permission I will read it.

ON CREOSOTE.

From over sixty down to about forty years ago, the scientific and commercial world both knew of but one substance to be called "Creosote." It was described as an "oil" distilled off "tar" at certain temperatures, and possessing notable antizymotic power, especially as applied to meat. From the latter circumstance it obtained its name, which signifies "meat-preserver."

This substance, so described, had first been found and announced by Reichenbach (1830–32). He discovered it in the tar derived from beechwood. He had, upon ascertaining its peculiar meat-preserving property, coined its name, as before stated.

But a very few years after him (1833–4), Runge, an equally eminent scientist, had discovered what seemed to be the same substance, in the tar derived from bituminous coal. It exhibited the same general physical qualities as the Creosote of Reichenbach, and yielded an equally energetic preservative action on organic matter. Consequently, with the methods of organic chemical analysis still in their infancy, as they then were, this was accepted as sufficient evidence of identity. The immediate result was, that for many years thereafter—as stated in the beginning of this memorial—the belief held universal sway that there was *one* Creosote, which might be obtained from wood-tar as well as from coal-tar.

This belief, of course, dominated the medical mind as well as the pharmaceutical, when "Creosote" had appeared in the domain of the materia medica. Sometimes the one, sometimes the other kind happened to be dispensed and administered; and the clinical reports of physicians on the results obtained with "Creosote" in various therapeutic uses were sometimes based on the employment of the one, sometimes on that of the other variety, without the authors' knowing that there was any difference between them, or indeed most often without their knowing, or caring to know, the origin of the drug.

For, although careful manufacturers very soon made a practice of labeling their goods with the statement of origin, still the designations "Creosote from Beechwood" and "Creosote from Coal-tar" conveyed no more idea of essential difference to the mind than would be conveyed, for instance, by the designations "Benzoic Acid from Benzoin" and "Benzoic Acid from Toluol."

(Distinct traces of remnants of that confusion are visible even yet in the descriptive texts relating to "Creosote," in several of the medical and pharmaceutical text books in use at the present day.)

This circumstance led, of course, to many varying and even contra-

dictory reports being embodied in pharmacologic and therapeutic literature—as to the action, dosage, toxicity, etc., of "Creosote," and consequently to an impression that this drug was exceeding variable and unreliable. It led, therefore, after a time, to the general disfavoring and discountenancing of "Creosote" in many lines of medical practice in which it had at first been joyously and hopefully received. Especially was this the case in the treatment of tuberculosis, in which Creosote had found favorable acceptance and high praise at a very early day already, but in which it fell, later on, into entire disuse and disrepute. Creosote has only been revived in this use during a comparatively brief series of more recent years, since the recognition of the distinctive nature of *Beechwood* Creosote has become established on clearly defined chemical lines, and has thence grown to be a matter of general appreciation with the medical profession. (This revival did not receive its first effective impulse until two French physicians, Bouchard and Gimbert, published the excellent results which the true Beechwood Creosote had yielded in a series of 93 phthisical cases treated by them. This was in 1877.)

So long as the medicinal uses of Creosote had remained unimportant in scope and extent, little attention was given to its exact investigation by chemical scientists. Thus, it was not until the "Creosote" muddle had continued almost a quarter of a century—in 1858—that Hlasiwetz led the first step toward demonstrating that the characteristic chemical nature of beechwood creosote is chiefly dependent on its large content of *methyl ethers of dihydric phenols*, among which pyrocatechin-methyl-ether (known pharmaceutically as guaiacol) is most prominent; whereas coal-tar and its distillates yield hardly any appreciable amount of dihydric-phenol derivatives, but contain most largely the *monohydric phenols*. And not until again a number of years later (1867) were those initial researches confirmed and amplified in satisfactory detail by Gorup-Besanez. Thus, the actual chemical status of true creosote was not well established and made generally known to the scientific world until fully thirty years' tradition had lent firmly-rooted sanction, in theory and in practice, to the erroneous legends and the consequent abuses that had crystallized around its name.

How slow the percolation or digestion of knowledge is from theory into practice, from the solid stratum of experimental fact, leached out by purely scientific research, into the broad liquid strata of general practical recognition and utilization, has hardly ever been shown in a more striking way than in this history of creosote. Only a dozen years ago, Holland still had in use a Pharmacopœia which expressly permitted the use of both the wood-tar and coal tar products under the official title of "Creosote." The confusion prevailing on this topic, up to the present day even, in some of our well-reputed materia medica text-books, has already been alluded to in this memorial. To quote but one of several prominent instances: a largely used work of this character, which within fourteen years past has

appeared in eight successive editions, still states in its latest revised edition, that "creosote" (N. B.—Creosote from "*wood*-tar") acts on the organism "practically the same as carbolic acid;" that it is "a powerful poison, resembling in its symptoms carbolic acid." Up to its fifth edition, it also stated that: "Being a very complex substance, of varying composition, creosote, as a therapeutic agent, has been almost entirely replaced by carbolic acid." Only in the last few editions of the book (well-nigh *thirty years* after Gorup-Besanez had definitely established the all-importance of guaiacol and its congeners in the chemical status of beechwood creosote) was this sentence (with others following it) altered to read as follows:

"Creosote.....has been almost entirely supplanted in therapeutics by Carbolic Acid for *external* use, and by *Guaiacol* for internal administration.....Guaiacol being the principal ingredient of Creosote."

And, nevertheless, the previously-quoted statements of practical physiological and toxicological identity of (U. S. P.) creosote with carbolic acid (!) remain uncorrected in the book to this day.

The last-cited amended passage, even as it stands now, is still misleading in its statement that "Creosote has been *almost entirely supplanted*," etc. If it had been so, there would be little need for the present memorial.

But, lest we seem to be individually critical toward a certain author only (who has, as previously stated, several noted companions in his misconception), we beg to adduce one other of these several examples. It is that of a teacher and writer of even broader national repute than the one just quoted, and editor of a widely-read medical journal. In the last-issued edition of his smaller therapeutic text-book (the vi., 1897), he still declares as follows:

"Creosote" (meaning the pharmacopœial article) "is chemically almost identical with carbolic acid.....Its physiological action is almost identical with that of carbolic acid."

And in a recent number of the medical journal edited by this author (printed in this year), the statement is repeated editorially:

"Creosote is almost chemically identical with Carbolic Acid."

Error, indeed, seems to die hard. For, despite the explicit definition of "Creosote" given by the United States Pharmacopœia, and despite, also, the warning notices affixed by the undersigned to all their "Creosote" labels, of both kinds, and printed likewise in their descriptive literature and reference-books—for many years past—the old confused traditions and fables regarding Creosote still appear to come to the surface

(" here, there and everywhere," one might almost say), in professional and other quarters.

As witness, for instance, the following passage taken verbatim from the published " Proceedings of the New York State Pharmaceutical Association, 1900," page 96 (being part of the " Report of Committee on Adulterations," read by its Chairman, Dr. G. Michaelis) :

" CREOSOTUM, U. S. P."

" Instead of the proper chemical, still much impure carbolic acid, more or less diluted with water and alcohol, is sold as Beechwood Creosote. Of the samples collected *more than forty per cent. proved to be the spurious article*, and while the percentage so found is not as large as two years ago, we again repeat what we have said in previous reports, viz., that *there is no excuse for this condition*, as a comparatively easy examination will promptly reveal the character of the liquid purchased."

For another instance, take this portion of a public discussion at the twenty-third annual meeting of the Missouri Pharmaceutical Association, as reported in their published " Proceedings, 1901," page 30. Mr. Mittelbach, of Boonville, Mo., said :

" Another thing I want to speak about is creosote. Merck puts up a coal-tar creosote and a beechwood creosote. They are both labeled creosote. I consider this very wrong, for *I do not doubt but what the coal-tar creosote is often dispensed for the beechwood creosote.* The average person would not notice the difference, and might kill the patient."

Here are two classical witnesses — and others of equally high standing can be cited—to the fact that :

Firstly, an alarming and reprehensible degree of looseness still prevails in some places, *leading directly to the serious danger of Creosote substitution.*

Secondly, the designation of two different and non-equivalent articles by *the common name of " Creosote"* (*notwithstanding* the addition of distinctive and qualifying epithets and the publication of cautionary notices on labels and in books) is regarded by competent pharmacists as a constant menace of careless substitution.

This second position has still further been reinforced in private letters received by the undersigned, from representative professional men, emphatically expressing the view (as we quote in the words of one of them) that—

" The word ' Creosote ' should be used *only* in connection with the *wood-tar* product;"

and that

" *the correction of the title* of the coal-tar product will benefit our " (the pharmaceutical) " profession."

In view of all the circumstances here related, the undersigned respectfully submit the following suggestion of a possible remedy for the correction of the Creosote traffic :

To achieve, or to attempt the reform of, long-established nomenclature, as here above demanded, may probably be justly assumed to be beyond our power at present.

But, nevertheless, we feel deeply the responsibility laid upon every one who issues under a "Creosote" label in this market anything but true pharmacopœial Creosote 'from wood-tar." And it is clear, furthermore, that, if emphatic caution labels distinctly warning against the dispensing, for internal administration, of anything but the true Beechwood Creosote, are by competent authority declared powerless to "save the mark," then, most certainly, the mere addition to the name "Creosote" of *such meaningless epithets* as "Commercial German," etc., as are found in this market on current brands, is utterly vapid and ineffective.

Under such circumstances, we can satisfy our sense of duty in the matter in no better and more effective way than by *doing away entirely with the offending article*, that is, by withholding "coal-tar creosote" from sale in future, and declining to fill any further orders for any creosote but that from beechwood.

To make such a move universally effective throughout our country, it should be made conjointly by all those who put up "creosote" for this market.

And, as there is in a question of this kind no potency anywhere equal and pertinent to the issue as is that of the American Pharmaceutical Association, we make free to lay this entire matter before you, with these requests:

That, firstly, it be taken under earnest consideration.

That, secondly, if such consideration prove favorable to the position outlined, this Association pronounce, by resolution, in favor of confining the Creosote traffic in this country to the United States Pharmacopœial Creosote alone.

That, thirdly, to give effect to the resolution, a public request be addressed by the Association to all those who place "Creosote" upon this market, to confine their dealings to the pharmacopœial "genus" thereof.

The undersigned firm, for one, herewith declare their cheerful readiness to do all within their power—even though it be at pecuniary loss to themselves—to avert a public danger thus clearly set forth as above cited.

They stand ready to cancel all their business in coal-tar Creosote, and to continue the sale only of beechwood Creosote.

We would not have ventured to obtrude this matter upon your attention, but for the obvious fact that the very large and constantly growing modern use of creosote as an internal medicine in the important disease of tuberculosis makes it incumbent on all good people to avert, if feasible, the enormous dangers that, under this circumstance, may be fitly considered as being involved in the possibility of the use of the wrong article.

As for the legitimate uses of the article thus proposed to be excluded

from the market, they are so limited, and can so readily be supplied by other similarly constituted remedies, that they ought not justly to be allowed to weigh against the large public benefits of the security to be gained by such exclusion.

Respectfully submitted, MERCK & Co.

The reading of the paper was greeted with applause.

MR. HALLBERG: I think the Association ought to extend its thanks to Messrs. Merck & Co. for this timely communication and for the stand they have taken in this matter, and I move that it is the sense of this Association that the example set by this firm should be followed by every other manufacturer and dealer in creosote.

Mr. Lowe seconded the motion.

MR. MAYO: To carry out the idea to its fullest extent, I suggest that the Secretary of the Section shall communicate the resolution we are about to pass to the dealers. If it is simply made a matter of record in our Proceedings, it may not come to their attention.

MR. HYNSON: I heartily approve of this matter of the sale of creosote; but there is a demand by the scientists—the microscopists—for the coal-tar creosote. I suppose they use it for hardening tissue, but anyway they insist on getting the coal-tar product.

MR. KEBLER: I took up this question of creosote a few years ago, and secured samples from all over this country and Europe, and I found, if I remember correctly, that not a single one contained over 25 per cent. of guaiacol, and from that down to nothing. From this the following point was impressed upon me very forcibly, viz., either the manufacturer removes the guaiacol, or it is not contained in the original product. In testing this complex compound, I found that a great many difficulties arose from the fact that there are a number of wood creosotes, such as oak, pine and others, which give certain color reactions; but when mixtures occur it is very difficult to decide what is present, on account of the uncertainty of color-reaction tests.

As to the commercial name, I think it is a very commendable position that the firm of Merck & Co. have taken. I had a rather interesting experience with a firm some time ago: They took the position that it was legitimate for them to call their article a given name because it was customary, and they were even upheld by the courts. Take benzoic acid, for example. They said the trade called for that, it did not make any difference where it came from. That creates a decidedly wrong impression with the average man, because there are a number of different sources from which it is procured. And the same is true of almond oil—almond oil which is at present not only obtained from almond kernels, but from peach kernels, apricots and other seeds of the same family. It is decidedly wrong to call oils obtained from these various sources almond oil.

MR. HALLBERG: What impurity did Mr. Kebler have reference to? The Pharmacopœia recognizes other wood-tar creosotes besides that from beechwood-tar.

MR. KEBLER: I did not know that.

MR. CASPARI: The Pharmacopœia states that fact very plainly, although preference is expressed for beechwood creosote.

MR. HALLBERG: If there is any test in the Pharmacopœia that we should take pride in it is the creosote test.

THE CHAIRMAN: The motion is, to approve of the stand taken by Merck & Co., and to express the sense of this Association that other dealers should follow their example, with reference to creosote and the making of it.

MR. SEARBY: Unless we are prepared to recommend to other dealers who have business to transact and goods to sell under what name they shall sell coal-tar creosote, I do not think our recommendation will amount to anything. The caution which Merck & Company place on their bottles containing genuine wood creosote is all very good, but that will not apply to creosote derived from other sources. These people have goods to sell, and if we recommend that they sell only wood creosote under the name of creosote, we must give them some other name under which they can sell coal-tar creosote. Crude carbolic acid might be well enough, but would they adopt it as the name under which coal-tar creosote should be sold? It must be remembered they get a better price for coal-tar creosote under that name than they get for carbolic acid.

MR. REMINGTON: I did not read quite all of this paper, but Merck & Company acknowledge that they have sinned in the past in this respect themselves. There is their label, creosote from coal-tar. But now they say from and after this date the use of this label, so far as Merck & Company are concerned, shall be discontinued, and that Merck & Company will sell no more creosote except from beechwood. They found serious results to happen because they followed the course of the trade. They say they will not do it any more, and they hope others will follow that example.

MR. EBERLE: I believe the name of beechwood creosote could be changed better than you could change the name of the creosote commonly called for by the people. You can better educate the physicians to a new name than you can the people. When the public asks for creosote they do not expect beechwood. Of course, in prescription work, the doctor prescribes beechwood creosote, and they could be educated better than the public.

MR. REMINGTON: Years ago, when the doses of both beechwood creosote and coal-tar creosote were small, there was no danger; but now when beechwood creosote is used in tuberculosis cases, for instanee, in teaspoonful doses, there is real danger in getting the two confounded.

MR. COBLENTZ: Last winter a number of samples of pure, colorless carbolic acid and one sample of crystalline acid were brought to my notice, all labeled creosotum, without any indication of the source from which derived. And I may say they were the products of prominent firms. Upon examination, I found them to be nothing but chemically pure carbolic acid. I think it is time the Association was taking some action to stop this nuisance.

MR. MAYO: The question of definition is an important thing in the courts, and we will add something to the weight of the proper definition of creosote by taking this action and having it recorded. Anything we can do in that way will help us in the courts, where it will come sooner or later. The term creosote was given to this product before carbolic acid was known at all—long before Deschambres discovered carbolic acid. The name has gradually come to be applied to carbolic acid—especially when creosote and carbolic acid were used indiscriminately for toothache. During the last fifteen years creosote has come to be used in such large quantities that there is a real danger in committing the least confusion as to these names. Inasmuch as the name should be applied to one article, it should be given to the original, and not permitted to be used in connection with carbolic acid at all.

MR. HINRICHS: While I fully agree with the principle of this matter, I doubt the

propriety of passing that resolution specifically in favor of some one firm, and I would suggest that we can obtain all that is possible by properly stating in the Pharmacopœia that is soon to issue what creosote is. As stated, historically it is well established there is no creosote except that from wood. And in that connection I would express the hope that a like confusion in regard to what is called in the Pharmacopœia artificial oil of wintergreen should be looked after and dropped, for there is no such thing in existence, to my knowledge. We should not officially do that which we condemn the public for doing.

MR. EBERT: Looking at this from a practical standpoint, are not the suggestions Mr. Eberle made much more proper for us to adopt? The committee for the Revision of the Pharmacopœia is now in session. Would it not be better to change the wood creosote and give it a scientific name, and not continue the unscientific name given it in 1833? Commerce has adopted that name and applied it to a dangerous substance, which is carbolic acid. Now would it not be more practical for the coming Pharmacopœia to give creosote a scientific name, and let the medical and pharmaceutical professions, which are not so numerous as the people at large, and much easier to educate, adopt that name?

MR. CASPARI: I scarcely think that would be possible. Creosote is not an individual or elementary body, and I do not think a scientific name would be possible for it. I do not see how you can get at it, since creosote is a mixture, chiefly guaiacol with some creosol. You surely cannot call it guaiacol, though it may contain 90 per cent. of this substance.

MR. EBERLE: Why not coin a name for it?

MR. CASPARI: Then it would not be scientific. Creosote is already a coined name and one of long existence.

MR. LYONS: There is not time to coin a name and get it introduced where there is danger to life right before us. It seems to me we should make a strong protest directed to those who have had the most to do in starting this thing, and let them know they are putting themselves in danger of getting into the courts in a very troublesome way.

The chair stated that the motion was, to label only wood-tar creosote as creosote, and to label coal-tar creosote not creosote at all, but by its proper name—carbolic acid; but without any objectionable reference to the name of any firm in connection with this action.

Mr. Mayo then offered the following resolution as expressing the sense of the Association on this subject:

Resolved, That in the opinion of the Scientific Section of the American Pharmaceutical Association the term creosote should be restricted solely to true wood-tar creosote, owing to the great danger arising from the present indiscriminate use of the term.

MR. REMINGTON: I think every purpose will be subserved by having this passed as the sense of the Association. All the pharmaceutical journals will publish it, particularly if requested by the Secretary to do so, and then it will go into the Proceedings as the sense of the Association.

THE CHAIRMAN: The motion as it stands now is, that this Association expresses its opinion to the effect that wood-tar creosote must be labeled creosote, and coal-tar creosote so-called must be labeled carbolic acid.

And the motion was so put and carried.

The chair called for the reading of the following paper by Mr. Lowe:

THE MEDICINAL PLANTS OF THE PHILIPPINE ARCHIPELAGO.

A REVIEW BY CLEMENT B. LOWE.

Through advanced sheets furnished by the courtesy of the publishers, Messrs. P. Blakiston's Son & Co. of Philadelphia, I am enabled to call your attention to a work with the above title that is just about to be issued.

The work was originally published in Spanish in Madrid in 1892, and was from the pen of Dr. T. H. Pardo De Tavera, a distinguished physician of Paris, originally a native of the island of Luzon. The book contains the results of two years' investigations of the plants of the Philippines by Dr. Tavera under commission of the Spanish government. Unfortunately the specimens gathered by Dr. Tavera of which it was designed to make further investigations and definite chemical analyses in Paris, were spoiled in transit through imperfect packing; consequently the constituents of many of the plants are only imperfectly ascertained.

The work has been translated into English by Capt. Jerome B. Thomas, Assis't Surgeon U. S. V., stationed in Manila. The book in size is a demy octavo of about 275 pages. The plants treated of are arranged according to their natural orders, the polypetalous dicotyledons being considered first, then the gamopetalous dicotyledons, and finally the monocotyledons. The work has a very full index which contains all the native names of the plants. It also contains a full therapeutical index which gives the diseases for which the plants are used in the islands. The book, of which Surgeon General Sternberg has ordered 500 copies for use of the army, is valuable for being the only one of the kind in existence, and it will probably prove a stepping-stone to further investigations. It is hoped that it will prove an incentive to the study of the plants mentioned by the medical and pharmaceutical officers of the government now stationed in these, our new possessions. To assist in this study, the botanical descriptions which are very fully given, and also the time of flowering, have been supplied by Dr. Thomas where they were wanting, and also the English names.

It might be profitable for some of the large manufacturing pharmacists to take up the study of the most used and apparently valuable of these Philippine drugs, have their constituents determined by chemical analysis and their medicinal properties determined by physiological experimentation.

Among the plants of special interest are Tinospora crispa, N. O. Menispermaceæ. Tagalo name of which Makabuhay means literally "you may live." This plant is one of the most widely known and used in the Philippines, a kind of cure-all. A decoction is given internally in malarial fevers and dyspepsia; and externally proves a valuable stimulating wash for ulcers. The stem is the part employed.

The Dipterocarpus turbinatus yielding Gurjun balsam grows in Luzon, Mindanao, and other islands.

One of the pleasant remedies used is the acid juice of Averrhoa Caramabola, which is successfully used in the treatment of bilious diarrhœa.

Samadera Indica, belonging to the Quassia Family, is used by the natives for fashioning cups and vases in which water is allowed to stand for 6 or 12 hours, as in the quassia cups used in our country, used for stomach disorders. Gum Elemi of the Philippines is distinctly claimed to be the product of Canarium commune, and that in addition to its value as a tropical application it has properties similar to Copaiba. In speaking of the seeds of Abrus Precatorius the author alludes to the fact that in the distant past they were used by the Filipinos to weigh gold.

One of the most popular remedies is Cassia alata; it is used largely for herpes, the juice of the fresh leaves being applied, its activity depending upon the chrysophanic acid present. A plant which should be studied is Entada scandens, N. O. Leguminosa. The mashed bark which probably contains saponin is used extensively as a substitute for soap in bathing, especially in bathing the hair, as it is said to render it very soft without drying it too much, as does soap. A popular shampoo preparation might be made from it. The maceration is vigorously applied by means of the bark in case of itch; the female acari is thus rubbed out of her burrow. Acacia Farnesiana grows everywhere, forming dense thickets in some of the provinces; it yields an abundant gum, quite similar to gum arabic, and equal to it in value. It is claimed that it will eventually supersede the latter in the Philippines.

In speaking of Carica Papaya it is stated that the natives use the cold infusion of the leaves to wash clothes spotted with blood, and the spots disappear rapidly by virtue of the ferment papain which digests the fibrin. The infusion is also used as a wash for sores and gangrenous ulcers.

Coffea Arabica is mentioned as constituting one of the greatest sources of agricultural wealth, and there are many ideal sites on the islands for its cultivation, so that in a short time it looks as if the United States would be independent of other nations as to its coffee supply. Alstonia scholaris yielding the Dita bark grows in the forests of Luzon, and is used extensively as an intermittent.

Nicotiana Tabacum grows in all parts of the islands. Among the interesting comments is the following, viz.: "The antiseptic power of tobacco is undoubted, but it is intolerable that a physician under the pretext of avoiding self-infection should enter the house of his patient-and continue smoking at the bedside."

Other interesting drugs might be cited, but perhaps I have mentioned enough to induce you to examine the book for yourselves.

MR. HALLBERG: I would like to ask why it is that Mr. Lowe did not mention anything about piper methisticum, which is the first drug of great interest that has been ex-

hibited in this country as coming from the Philippine Islands. The most wonderful results are said to be obtained from the use of it in the form of a beverage. How is it that that has not been mentioned in the paper?

MR. LOWE: I only mentioned a few; that is all.

A paper on the Histology and Development of the Fruit of Illicium Floridanum, by Mr. J. O. Schlotterbeck, was read by title only, and on motion referred for publication. The following is the complete text:

THE STRUCTURE AND DEVELOPMENT OF THE FRUIT OF ILLICIUM FLORIDANUM.

BY J. O. SCHLOTTERBECK AND C. R. ECKLER.*

Considerable interest attaches to the genus Illicium, because of the great commercial importance of the volatile oil which is obtained from the fruit of Illicium verum by distillation. Two well-known species I. verum and I. religiosum are natives of China, and two others, I. floridanum and I. parviflorum, are restricted to the southern states of North America. The Asiatic species have been subjected to extended botanical and chemical consideration, while the American species have been practically neglected. In order to gain further insight to the botanico-chemical relations of this interesting genus of plants, this microscopical study has been begun. A large quantity of the fruit and leaves has been placed at our disposal through the kindness of Prof. S. M. Tracy, of Biloxi, Miss., for botanical and chemical study, and we wish at this time to thank him for his kind assistance.

As we stated above, the American species have been neglected by botanists as well as chemists, and for that reason very little literature is to be found upon the subject. Griffith, in his Medical Botany, says that the bark has been used as a substitute for cascarilla, and that the leaves are poisonous. H. C. C. Maisch (Amer. Journ. Pharm. *57*, 225) furnishes three plates of drawings and a short description of the histological characters of the root, stem, leaf, capsule and seed of Illicium floridanum, but the work was hurriedly executed.

Illicium floridanum is a small tree growing in sandy swamps of Florida, Alabama and Mississippi. Its leaves are four inches long, one and a half inches wide, oblong lanceolate, entire, smooth, rather thick and containing very much mucilage. When dry, they are very fragrant, especially when crushed. The flowers are about an inch wide, having twenty to thirty dark purple linear petals in three whorls. Sepals six, from green to purple in color. Stamens thirty or more and very short. The ovaries, of which there are generally thirteen, are erect in the flower, but after fertilization has been effected, they begin to spread out until finally, in the ripe fruit, they assume the position seen in the ordinary star anise.

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* Holder of F. Stearns & Co. Fellowship in Pharmacognosy in the School of Pharmacy of the University of Michigan.

The ripe fruit consists of from twelve to fifteen carpels, and occasionally twenty, stellately arranged, but the usual number is thirteen. The carpels are boat-shaped, with a curved beak, rather woody and wrinkled, of a brown color, dehiscent at the upper suture, though in many cases the seeds force their way through the solid tissue of the carpel at the under side. The carpels are one-seeded, and have a fragrant odor and a sweetish aromatic taste. The seeds are odorless and taste oily. The fruit stalk is about 40 mm. in length, generally curved, enlarged, and wrinkled at its point of attachment to the fruit.

Study was begun upon the ovules of flowers from which the petals were about to drop. A longitudinal vertical section (Fig. 10) shows the ovule to be of the anatropous type. The slight curve of the beak of the carpel is maintained throughout the entire development. The enlarged drawing represents this stage.

The transectional view of an ovule at this stage is represented in Fig. 13. The outer integument consists of five layers of cells. The epidermal cells are much larger than any others of either integument. The inner integument is composed of three layers of cells of about the same general size, though the cells of the middle layer are somewhat longer tangentially and more flattened than those of the outer layers. The cells of this integument are about equal in size to those of the nucellus, which, with the exception of the two outer layers and the two next to the embryo sac, are very irregular in outline—all cells showing a small nucleus. The section showed the raphe (*R*) at this point composed of many fine, thin-walled, elongated cells, tightly compressed. The ovule, as it appears in the carpel, is represented in Fig. 11.

Fig. 14 represents the cellular structure of the integuments, cut in the same direction as in Fig. 12. In Fig. 13 the cells of the epidermal layer are seen to be larger and broader than those of any other layer of the integuments, but in the next figure they seem really much smaller than the others and more elongated. This comparison is not of much moment, however, as the sections were not cut in the same direction. Fig. 14 represents a higher stage than Fig. 13, though closely following it.

From this stage the lateral walls of the epidermal cells become, near the outside, very wavy, while toward the inside they retain their regular or simpler outline. This is shown in Fig. 14a, which is a surface view. Up to this point no thickening of cell walls had seemingly taken place, but in Fig. 15, drawn from a longitudinal section of a nearly full grown seed, there is considerable thickening in the outer portion of the epidermis. This thickening, as seen in the drawing, was very irregular and many or most of the walls were deeply pitted. The outer layer of cells of the inner coat were large and expanded, but the other two layers appeared tightly compressed and approaching a state of collapse. None of the cells of this coat showed thickening.

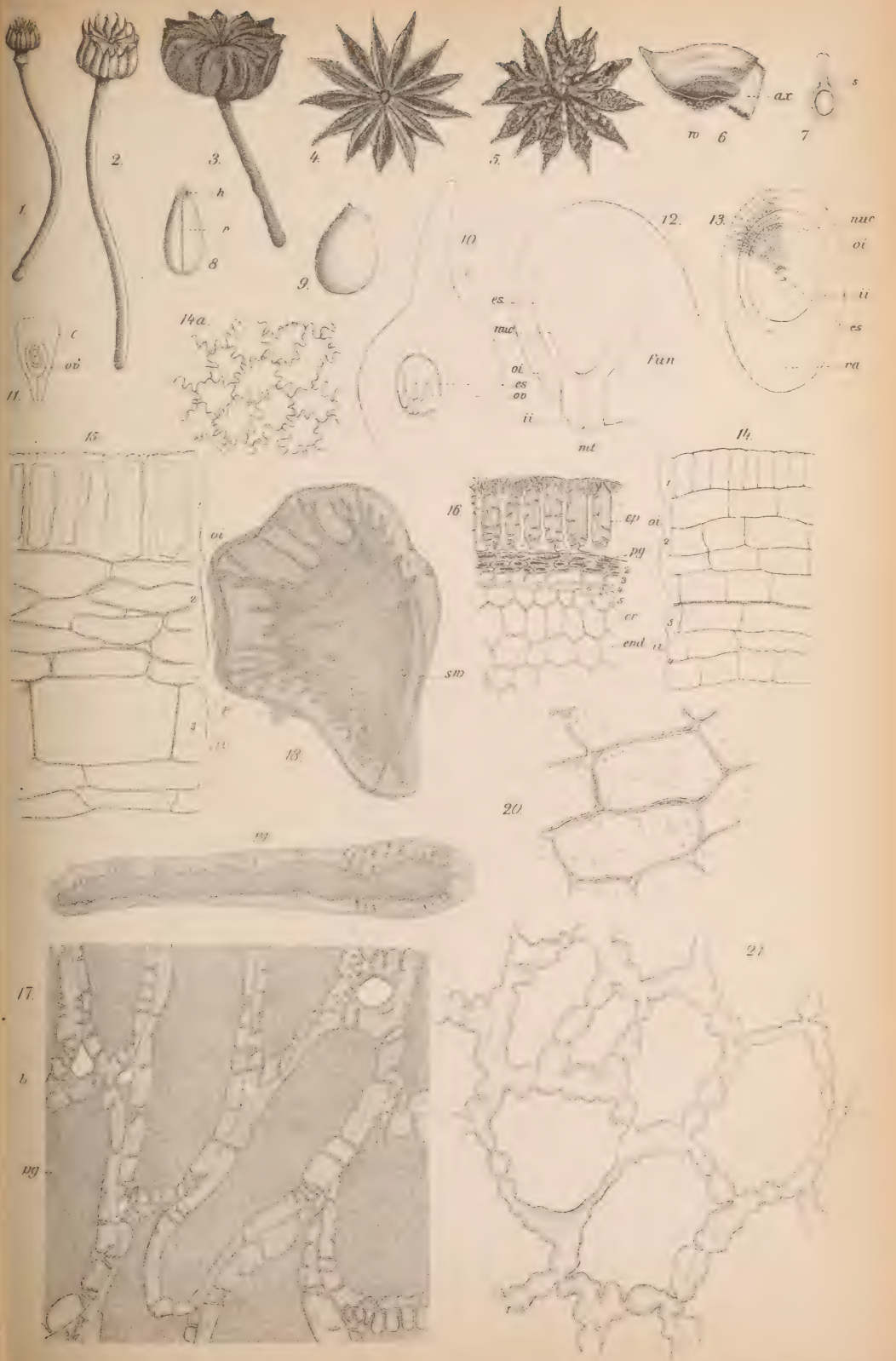
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Fig. 16 represents a transverse section of the seed coats of a ripe seed. The epidermal cells have become immensely thickened and deeply pitted. They were almost colorless, the color of the seed being due to a pigment layer consisting of the other four rows or layers of cells of the outer seed coat (Fig. 16–2).

The pigment cells possess very thick walls of a light yellow color, deeply pitted and filled with a dark brown pigment. The layer immediately under the epidermal cells was especially thickened, and particularly on the outer side, also possessing more pits than the others. The innermost row of cells of this pigment layer were less thickened and generally longer. These four rows or layers with the epidermal layer constitute the outer seed coat. They are all lignified, giving the test with HCl and phloroglucin. The inner seed coat consists of three layers (Fig. 14, 3–4), the two lower layers (4) having become completely collapsed.

Many small crystals of calcium oxalate were present in this collapsed layer, Fig. 16. The epidermis of the inner coat or integument was composed of thin-walled cells only partially collapsed.

The surface view of the epidermal cells of the outer integument of the ripe seed is reproduced in Fig. 22.

Fig. 17 represents the surface view of the outer layer of the pigment cells. The walls are light yellow in color and the contents dark brown. The drawing shows how the cells lap over one another. These cells which appear to lie loosely in the pigment layer are connected by little supports or bridges of cellulose.

The surface view of one of these cells isolated is shown in Fig. 19. One of the most striking features of these cells is the irregularity in thickness of the walls. They may be extremely thickened at one side while at the other the wall may be so thin as to break in the operation of section cutting. The cell as here drawn (Fig. 18) is tipped slightly upon its side and the upper ovate surface wall partly hides the side wall from view (s. w.).

On the one side of the cell are many little projections which fit snugly about the adjoining cells. This is typical of the cells constituting the outer portion of the pigment layer. Many of them were long, especially those in the lower layers, Fig. 19. Still farther inward in the pigment zone we found cells (Fig. 20) whose walls were only slightly thickened, but quite uniformly so. They were numerous and finely pitted and attached to each other by connectives (b).

The extremely thickened epidermal cells with their wavy outlines dovetail into each other to provide an extremely hard and resistant protective coat. The inner seed coat is so much softer that in cutting sections the outer coat almost invariably tears and breaks away from the inner one, Fig. 23. In Fig. 6 a carpel is split longitudinally in the plane connecting the two sutures and exposing the inner surface. The beak curves upward

slightly. At the lower side there is a dark brown wrinkled portion (w), and just above it the seed cavity, which is brown and glossy. At the right a portion of the columella or axis is attached.

Fig. 7 represents a carpel containing a seed cut transversely. This carpel was about to dehisce, since the edges of the carpel are slightly parted. At the little shoulder (s) there is on either side a somewhat triangular darkened area of tissue. This tissue is composed of many small rounded stone cells. Fig. 24 shows a portion of the carpel at this point much enlarged. The long, thin-walled cells (a) extend around the seed and undergo a gradual transition in form to thickened, rounded, pitted stone cells (b). The remaining tissue of the carpel is comparatively soft and composed of irregular thin-walled cells with many large intercellular spaces. The cell walls were of a dark yellow color.

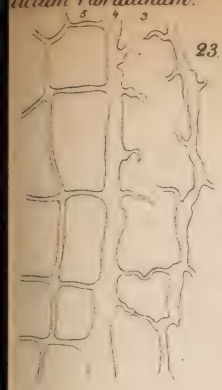
The seeds are oval, flattened, about the size of an apple seed, having a very large elongated hilum. They are of a yellowish brown color, much lighter in color about the raphe, which is itself dark brown. Fig. 9 represents a seed enlarged in profile, Fig. 8 a front view, showing the raphe, which runs nearly the full length of seed. The seed coat about the hilum is nearly white or of a very light yellow color. We found but little difference in the epidermal cells at this point, but the cells of the pigment layers appeared as in Fig. 21 in surface view. The cells did not seem so distinctly isolated, the walls being more contiguous.

The fruit stalk in cross section is shown in Fig. 25. The tissue of the cortex was soft and composed of rather thin-walled cells with many large intercellular spaces. Scattered about in the tissue, we found a few thick-walled cells or sclereids. Some appeared to be very simple (*Sc*, Fig. 25), while others were very irregular in outline, having many projections. All of them possessed numerous large, deep and branching pits. In some the cell-cavity was quite large, while in others there was hardly any cavity at all, the walls having become extremely thickened.

Types of some of the more irregular ones found in cross sections may be seen in Figs. 26 and 27. Figs. 28 and 29 represent two in position, as found in a longitudinal section of the fruit stalk.

DESCRIPTION OF PLATES.

1. Very young fruit, enlarged two diameters.
2. Older fruit, natural size.
3. Nearly full-grown fruit, two-thirds size.
4. Ripe fruit, ventral side.
5. Ripe fruit, dorsal side.
6. Ripe carpel, cut longitudinally.
7. Same, enclosing seed, cut transversely at middle of carpel.
8, 9. Ripe seeds.
10. Carpel with ovule, youngest available stage.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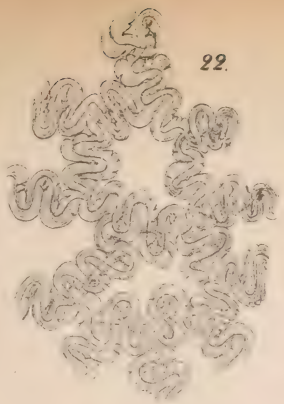
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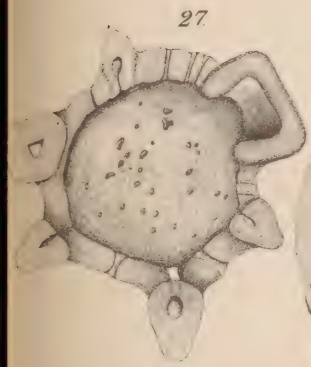
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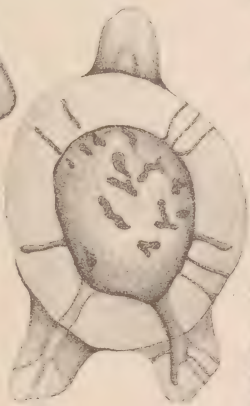
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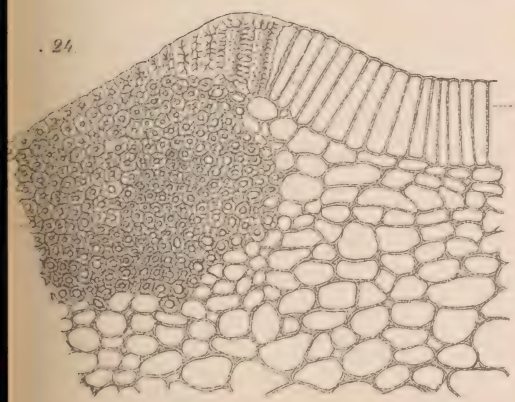
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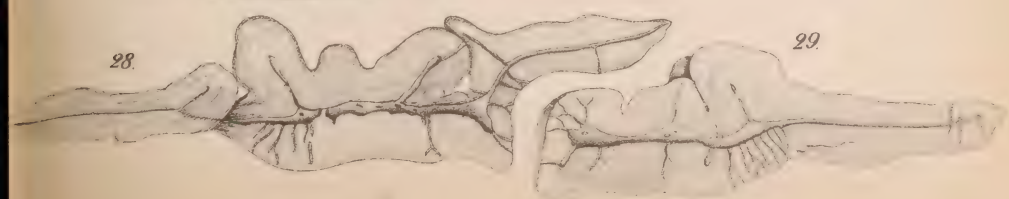
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11. Cross section of ovule, same age as 10, magnified six diameters.
12. Ovule isolated and enlarged.
13. Same ovule, transverse section.
14. Cross section of integuments of ovule, older than 13.
14a. Tangential view of epidermis of same.
15. Cross section of integuments of ovule from nearly full-grown fruit.
16. Cross section of seed coats of ripe seed.
17. Tangential view of overlapping pigment cells, outer layer of Fig. 13.
18, 19. Isolated pigment cells.
20. Pigment cells, innermost layer.
21. Cells of pigment layer near hilum.
22. Tangential view of epidermis of ripe seed.
23. Collapsed inner integument of seed coat.
24. Transverse section of carpel at "s" in Fig. 7.
25. Transverse section of fruit stalk at bend in Fig. 2.
26, 27. Sclereids found in fruit stalk. Cross section.
28, 29. Sclereids found in longitudinal section of fruit stalk.

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The following paper by H. M. Gordin was read by title and referred, the author not being present at the time:

THE ALKALIMETRIC FACTORS OF DIACID ALKALOIDS.

BY H. M. GORDIN.

In a previous paper* I proposed a method for the alkalimetric estimation of alkaloids. In applying the method to different organic bases we have to know beforehand their combining weights with acids, their so-called alkalimetric factors. At first sight it would seem that these factors are directly given by the molecular weights of the alkaloids. This would really be so if all alkaloids had in all cases the same function with regard to acids, be this function monoacid or polyacid. But as a matter of fact, many alkaloids form two, or even more, series of salts, in some of which the alkaloid acts as a monoacid base, in others the alkaloid acts as a polyacid base. It is owing to this multiple function of many alkaloids that much confusion exists about the saturation points of these alkaloids with regard to different indicators.†

As in my alkalimetric method the combined acid is removed together with the base from the liquid, the problem reduces itself to the question, what is the composition of the precipitate produced by Mayer's and Wagner's reagents in the alkaloidal solution with regard to the combined iodine. In the case of monoacid organic bases, it is most probable that this composition is always $BHII_n$ or $BHI(HgI_2)_n$, where B stands for one molecule

* Ber. d. Deutsch Chem. Ges. 1899, 2871. Pharm. Arch. Vol. II, No. 10.

† See Allen Org. Anal. 2d edition, Vol. III, part III, page 79 and further.

of the monoacid base and n varies according to circumstances.* For a large number of monoacid bases, the truth of the assumption of this composition has been proven experimentally.† But the case is different with bases which form more than one series of salts. The cinchona bases, for example, form halogen salts having the following composition: B.HCl, B.2HCl and B.3HI.‡

It would seem that as we always work in the presence of an excess of acid, the base in going out of solution ought always to carry along an amount of hydriodic acid corresponding to the highest state of basicity of the alkaloid. In the case of a monoacid alkaloid, using sulphuric acid for titration and Wagner's reagent as a precipitant, the reaction ought to go on according to the equation $B_2H_2SO_4 + 2KI.I_n = 2BHI.I_n + K_2SO_4$. In the case of a diacid base, then, the reaction ought to take place as follows: $BH_2SO_4 + 2KI_n = B2HI.I_n + K_2SO_4$.

In the first case one molecule of the monoacid base carries down one molecule of the monobasic acid (hydriodic). In the second, one molecule of the diacid base carries down two molecules of the monobasic acid, which is to be expected. But I have already shown in another paper § that berberine, even in the presence of excess of acid, is precipitated by Mayer's or Wagner's reagents, or potassium iodide along with only one molecule of hydriodic acid. The reaction in the case of berberine is then as follows: $BH_2SO_4 + KII_n = B.HI.I_n + KHSO_4$. In this case a diacid base changes its basicity and is precipitated with only one molecule of hydriodic acid. In applying my alkalimetric method to the estimation of diacid bases it becomes necessary to establish the basicity of the alkalimetric factors of these alkaloids with regard to the amount of acid they take up when precipitated by Mayer's or Wagner's reagents.

So far I have examined the behavior of the four principal cinchona alkaloids, and have found that, unlike berberine, these alkaloids, when precipitated in presence of excess of acid, take up two molecules of hydriodic acid for each molecule of the base. This can be seen from the following analytical data. The precipitant was in all cases a 2 per cent. solution of iodine in potassium iodide; the acid and alkali were standardized with pure anhydrous morphine, and were of $\frac{N}{10}$ strength. The pure anhydrous cinchona alkaloids (dried at 130° C.) were dissolved in small quantities of chloroform contained in a 200 Cc. flask, 50 Cc. of the $\frac{N}{10}$ acid was then added, and the flask kept on the water-bath till all odor of chloroform had disappeared. The last traces were removed by a current of air from foot bellows. After cooling, an excess of the iodine

*Gordin and Prescott. J. Am. Chem. Soc. 20, 329. *Ib.*, 20, September, 1898. *Ib.*, 21, September, 1899.

† Loc. cit.

‡ E. Schmidt, Pharm. Chem. 1896, II, pages 1412, 1433, 1437.

§ See the foregoing paper.

solution was then added and the estimation finished as described by my method.*

Alkaloid.	$\frac{N}{10}$ acid consumed.	$\frac{N}{10}$ acid taken.	Diacid Factor.	Found.	Taken.	Precipitant.
Quinine	37.4 Cc.	50 Cc.	0.00404	0.151	0.1527	Wagner's rgt.
Quinine	27.4 Cc.	50 Cc.	0.00404	0.112	0.1123	Wagner's rgt.
Quinidine	25.8 Cc.	50 Cc.	0.00404	0.1042	0.1050	Wagner's rgt.
Quinidine	29.8 Cc.	50 Cc.	0.00404	0.1204	0.1201	Wagner's rgt.
Cinchonine	32. Cc.	50 Cc.	0.00367	0.1174	0.1223	Wagner's rgt.
Cinchonine	38.8 Cc.	50 Cc.	0.00367	0.1425	0.1508	Wagner's rgt.
Cinchonidine	21.4 Cc.	50 Cc.	0.00367	0.0785	0.0831	Wagner's rgt.
Cinchonidine	34.2 Cc.	50 Cc.	0.00367	0.1255	0.1310	Wagner's rgt.

The results for quinine and quinidine are very good, for the other two alkaloids they fall short about 5 per cent. below the theory. This can possibly be explained by assuming that my cinchonine and cinchonidine were not very pure. I shall try to purify them, and see whether better results cannot be obtained. But even as it is, the results leave no doubt that all of the four principal cinchona alkaloids do not behave like berberine, but remain diacid to the end.

Cincinnati, O., August, 1901.

Next was a paper on Sea Salt, by Joseph Feil, which was read by title only:

SEA SALT.

BY JOSEPH FEIL, PH. G.

In nearly every drug store in the United States there is sold in small wooden boxes holding four or five pounds or in cotton bags containing about ten pounds a substance in cubical crystals measuring along an edge from three to eight millimeters and labeled Sea Salt. It is usually slightly gray in color, due to a very small quantity of organic or earthy matter, has an impure saline taste, when dissolved in water the solution is somewhat opalescent and has a distinctive marine odor; occasionally a specimen is found containing an admixture of a few brownish-yellow crystals.

I could find no reference to this commercial article in any standard pharmaceutical work or in a search through the pharmaceutical journals at my command. The United States Dispensatory and Watt's Dictionary of Chemistry give the name as a synonym of Sodium Chloride; the title is not mentioned in the National Dispensatory. On asking the meaning of quite a number of intelligent and well informed pharmacists, I received one of two answers, viz., "it is the saline residue of evaporated sea water" or "it is rock salt," and the majority seemed to have the latter opinion.

* Ber. d. Deutsch Chem. Ges., 1899, 2873.

The physical characteristics enumerated above all seem to point to a probable marine origin, excepting the taste was not bitter as sea water and the substance was hardly hygroscopic enough to contain the amount of magnesium chloride and calcium chloride said to be contained in the water of the ocean. An investigation seemed desirable.

That sea water must vary in composition is well known, and the reasons therefor are too well understood to need repetition here, but for comparison an analysis by Thorpe and Morton given by Roscoe and Schorlemmer in Treatise on Chemistry, Vol. I, p. 257, is copied below:

100 Gm. sea water contain:—

Sodium chloride	2.643918
Potassium chloride	.074619
Magnesium chloride	.315083
Magnesium bromide	.007052
Magnesium sulphate	.206608
Magnesium carbonate	traces.
Magnesium nitrate	.000207
Calcium sulphate	.133158
Calcium carbonate	.004754
Lithium chloride	traces.
Ammonium chloride	.000044
Ferrous chloride	.000503
Silicic acid	traces.
	3.385946

Authorities, however, state that the chemical composition of ocean water is comparatively constant and varies usually less than five per cent. in the proportion of its various constituents. The Dictionary of Applied Chemistry—Thorpe—gives fourteen analyses of rock salt obtained from various countries and different geological formations; these vary in the important constituents as follows:

Sodium chloride—from 100 to 97 per cent.
Potassium salts—practically none.
Magnesium oxide—from 1 per cent. to none.
Calcium oxide—found only in one specimen and then to the extent of ½ per cent.

The Dictionary of Arts, etc.—Ure—states that sea salt is deprived of magnesium salts by the following method: Quicklime is added and magnesium hydroxide precipitated and calcium chloride formed, an addition is then made of sodium sulphate and the calcium precipitates as sulphate, but as this is soluble to the extent of 1 part in 400 of water, of course some remains in solution and appears in the salt.

P. L. Simmonds in "Commercial Products of the Sea," gives two analyses of French crude sea salt (that is, the first crystallization of evaporated sea water) as follows:

	Salt of the South.	Salt o the West.
Sodium chloride	95.11	87.97
Magnesium chloride	.23	1.58
Magnesium sulphate	1.30	.50
Calcium sulphate	.91	1.65
Earthy particles	.10	.80
Water	2.35	7.50
	100.	100.

I collected quite a number of specimens of commercial sea salt and found that about three varieties could be distinguished :

a. Large crystals measuring about eight millimeters, quite clear.

b. Small crystals about four millimeters in length, light gray in color.

c. Small crystals about three millimeters along the edge, gray in color with an admixture of a few brownish-yellow crystals.

An analysis of a typical specimen of each variety gave the following results :

	A.	B.	C.
Moisture	2 to 3 per cent.		
Odor of solution	Distinctly marine.		
Taste of solution	Impure saline but not bitter.		
Clearness of solution	Almost clear.	Slightly opalescent.	Opalescent.
Potassium oxide	traces.	traces.	traces.
Magnesium oxide in 100 Gm.	.002	.003	.003
Calcium oxide in 100 Gm.	.376	.482	.590
Sulphur trioxide in 100 Gm.	.224	.260	.328
Iron	none.	none.	traces.

An insoluble residue of a few milligrams microscopically examined showed merely a little silica and a crystal or two of calcium sulphate.

A careful study of these analyses, compared with the information given above, would seem to indicate very clearly that the specimens were certainly *not* rock salt, as this substance is usually free from calcium salts and sulphates and its solution has no odor. On the other hand, these samples certainly do not in any way represent all the saline constituents of sea water, and yet have quite a number of distinctive characteristics found in such material. The following explanation seems to me to clear up the matter :

The sea salt of pharmaceutical commerce is crude sea salt, or the first crystallization of concentrated sea water, purified by quicklime and sodium sulphate, as stated by Ure ; this will account for every difference in chemical composition and makes clear all the peculiar physical characteristics. Therefore, pharmaceutically speaking, sea salt is not a synonym of sodium chloride, but has a distinctive use as a name for an article very extensively used and obtained from the sea. The large use of this substance would

seem to entitle it to pharmacopœial recognition, and in case such action is considered desirable, I would respectfully suggest that the characteristics and tests should not be those of a substance representing the entire saline residue of sea water, as it is not physically well fitted for ordinary retail sale, but the average properties of the substance found in about every drug store would be the proper ones.

SUMMARY.

1. Sea salt is neither evaporated sea water nor rock salt.
2. Sea salt is purified crude sea salt.
3. The substance last named should find a place in the U. S. P., owing to its well-established use.
4. Sea salt is not a proper synonym of sodium chloride, pharmaceutically speaking, at the present time.

Cleveland, O., August 19, 1901.

A paper by W. A. Puckner on the Estimation of Chloroform was read by title and referred to the Committee on Publication.

THE ESTIMATION OF CHLOROFORM.

W. A. PUCKNER, CHICAGO.

In estimating the alkaloidal content of drugs by the method of Keller or one of its modifications a mixture of chloroform and ether is used. Hence in laboratories where many such estimations are made, much waste chloroform-ether mixture accumulates. This of course can readily be brought to a condition so that it can be used over again. Having distilled such a mixture, removed most water and alcohol with calcium chloride, etc., I have often been in doubt regarding the relation of ether to chloroform in the distillate. Not knowing the exact amount of alcohol and water remaining in it, a determination of its specific gravity did not seem a safe criterion of its composition. Accordingly my attention was turned toward a chemical method of estimating chloroform. Of the many methods proposed for the purpose, that of L. de Saint Martin * seemed to be best adapted to the case in hand. Here chloroform is heated with an excess of an alcoholic solution of potassium hydroxide in a sealed glass tube, when the reaction $CHCl_3 + 4KOH = HCOOK + 3KCl + 3H_2O$ occurs. The tube is kept in boiling water for three hours, then cooled, opened, the alkali neutralized and then the chloride determined with volumetric silver nitrate.

The experiments detailed below were made with a view of avoiding the use of a sealed tube. Incidentally the effect of a shorter time of heating as well as the feasibility of determining the chloroform from the amount

* Compt. rend. 106, p. 492. Ztschf. f. anal. Chem. 30, p. 497. Proc. A. Ph. A. 40, p. 966.

of alkali which disappeared during the digestion was considered. In attempting to replace the sealed tubes with bottles, preliminary experiments showed that rubber stoppers could not be used, while corks when in contact with the alkali were quickly destroyed. Finally satisfactory results were obtained when the liquids were measured into a two-ounce vial, stoppered with a sound cork, this covered with muslin and tied down firmly, the chloroformic solution mixed with the alkali by rotation * and placed in boiling water in an upright position so that at no time the contents came in contact with the cork. The experiments made to determine the time of heating required for complete decomposition of the chloroform follow. The chloroform-ether mixture used was made by adding to 36.55 Gm. chloroform, sp. gr. 1.47566 at 25° and hence containing 0.615 per cent. alcohol, † sufficient ether to make 250 Cc. To facilitate accurate measurements 100 Cc. of this was diluted with alcohol to make 1000 Cc. and this chloroform-ether solution, 1 Cc. of which contains 0.01453 $CHCl_3$, was used in all the experiments.

In each case 10 Cc. of an alcoholic potassium hydroxide solution, which was equivalent to 7.07 Cc. normal alkali, was measured out; to this 10 Cc. of the chloroform-ether solution, corresponding to 0.1453 Gm. $CHCl_3$ was added, the vial corked and digested as before described. After heating for the specified length of time the bottles were removed from the bath, allowed to cool and then the chloride determined by Volhard's method,‡ and from this the weight of the chloroform calculated.

Time of digestion: one-half hour. Chloroform found: a^1 0.1420 Gm., a^2 0.1421 Gm., f^1 0.1432 Gm., f^2 0.1432 Gm., f^3 0.1435 Gm.§ Average 0.1435 Gm., or 98.76 per cent. of theory.

Time of digestion: one hour. Chloroform found: b^1 0.1420 Gm., b^2 0.1421 Gm., b^3 0.1423 Gm., d^1 0.1440 Gm., d^2 0.1436 Gm., d^3 0.1437 Gm., g^1 0.1438 Gm., g^2 0.1435 Gm., g^3 0.1434 Gm., i^1 0.1453 Gm., i^2 0.1440 Gm. Average: 0.1435 Gm., or 98.76 per cent. of theory.

Time of digestion: three hours. Chloroform found: e^2 0.1435 Gm., e^3 0.1450 Gm., h^1 0.1451 Gm., h^2 0.1451 Gm., h^3 0.1446 Gm., j^1 0.1445 Gm., j^2 0.1445 Gm., j^3 0.1449 Gm. Average 0.1447 Gm., or 99.59 per

* It was accidentally noted and later demonstrated that an alcohol-ether-chloroform solution might be measured on top of an alcoholic potassium hydroxide solution, kept in boiling water for three hours and yet the reaction be incomplete.

† Squibb, Ephemeris, IV, p. 1432.

‡ This process was used instead of Mohr's chromate method because the alcoholic potash solution was highly colored and also to avoid the need of accurately neutralizing the solution. The alkali solution used contained some chloride, which was determined and corrected for in each case.

§ Determinations bearing the same letter were carried out at the same time, thus f^1, f^2, f^3, were measured out at the same time, heated together, titrated under the same conditions, etc.

cent. of theory. These results show that the decomposition was incomplete when the time of heating was reduced to one hour. Hence three hours' digestion was adopted for all later experiments.

To show that the reaction is strictly quantitative and independent of the relative amounts of alkali some determinations were made in which the quantity of chloroform was varied.

Using 5 Cc. of the chloroform-ether solution, representing 0.0727 Gm., $CHCl_3$ digesting three hours and otherwise proceeding as before, there was chloroform found: k^1 0.0718 Gm., k^2 0.0719 Gm., k^3 0.0720 Gm. Average 0.0719 Gm., or 98.90 per cent. of theory.

Using 15 Cc. chloroform-ether solution, containing 0.2170 Gm. $CHCl_3$, the determinations showed only: l^3 0.2141 Gm., and l^4 0.2137 Gm.

Using 15 Cc. and increasing the alkali to 25 Cc. there was chloroform found: m^1 0.2167 Gm., m^2 0.2160 Gm. Average 0.2174 Gm., or 99.71 per cent. of theory.

This shows that in 1 the amount of alkali was insufficient. While theoretically 7.07 Cc. normal alkali, the amount used, should decompose 0.2375 Gm. chloroform, only 0.214 Gm. decomposed, indicating that some excess of alkali, which however need not be great, must be present.

The results obtained with this method being all that could be desired, the method itself sufficiently simple and expedient, it was yet considered worth while to attempt the substitution of an alkalimetric titration for the chlorine estimation, inasmuch as standard acid solutions are always at hand, while the titre of a silver nitrate solution must frequently be redetermined. Accordingly a series of determinations were made with this end in view.

The alcoholic potassium hydroxide solution here used was standardized by measuring portions of 10 Cc. each into the same vials, later to be used in the chloroform digestions, the vials were corked, digested for three hours as usual, allowed to cool, phenolphtalein added, and the alkalinity determined with volumetric sulphuric acid. Manipulating in this way there was required 10.21 Cc., 10.25 Cc., 10.22 Cc., 10.22 Cc., 10.24 Cc. Average, 10.23 Cc. Hence 10 Cc. alkali are the equivalent of 10.23 Cc. volumetric normal acid. Now portions of 10 Cc. of this alkali were mixed with, respectively 5, 10 and 15 Cc. of the chloroform-ether solution before mentioned, digested as before, and when cool titrated with normal sulphuric acid. This volume deducted from the volume required to neutralize the 10 Cc. of alkali taken, namely 10.23 Cc., and the remainder multiplied by 0.02977 should give the weight of choroform taken.

5 Cc. chloroform-ether solution taken. Chloroform found: n^1 0.0700 Gm., n^2 0.0696 Gm., n^3 0.0694 Gm. Average 0.0696 Gm. or 95.73 per cent. of theory.

10 Cc. chloroform-ether solution used. Chloroform found: o^1 0.1374 Gm., o^2 0.1379 Gm., o^3 0.1384 Gm. Average 0.1379 Gm. or 94.91 per cent. of theory.

15 Cc. chloroform-ether solution used. Chloroform found: p^1 0.2077 Gm., p^2 0.2077 Gm. or 95.71 per cent. of theory.

The results are from four to five per cent. low. This may be due to alkalinity derived from glass the decomposition of which was quite apparent, although it was intended to correct for this by the manner of standardizing the alkali. More probably the potassium formate decomposed to a slight extent even under the conditions of the experiment,* thus increasing the alkalinity by formation of potassium carbonate. To show that the low results were not due to an incomplete decomposition of the chloroform, the chloride was determined in the finished titrations. And in this case by means of direct titration with silver nitrate, using potassium chromate as indicator, *i. e.*, the titration with sulphuric acid having been carried out, the chloride was determined in the now neutral solution with decinormal silver nitrate and potassium chromate. The results:

n^1 0.0728 Gm., n^2 0.0722 Gm., n^3 0.0722 Gm. Average 0.0724 Gm. or 99.60 per cent.

o^1 0.1446 Gm., o^2 0.1449 Gm., o^3 0.1449 Gm. Average 0.1448 Gm. or 99.65 per cent.

p^1 0.2161 Gm., p^2 (not finished), or 99.58 per cent.;

again showing the reliability of the silver method. No further attempts were made to employ the alkalimetric titration, and the following method of estimating chloroform adopted: To 10 Cc. of an approximately normal alcoholic solution of potassium hydroxide, either free from chlorides or else of a known chloride content, and contained in a vial, add a measured volume of the chloroform-ether mixture representing 0.05–0.2 Gm. chloroform,† stopper with a sound cork, cover with cloth and tie this down firmly, mix the two liquids by rotation, then place the vial in boiling water in such a way that at no time the contents come in contact with the cork and retain the temperature for three hours. Remove the vial from the bath, let cool, add phenolphtalein and then sufficient sulphuric acid to exactly neutralize the liquid,‡ then add two drops of potassium chromate T. S. and titrate with decinormal silver nitrate. Or if Volhard's method of estimation is preferred, add to the finished digestion 10 Cc. dilute nitric acid, an excess of decinormal silver nitrate, 5 Cc. ferric ammonium sulphate T. S. and determine the excess of silver nitrate with decinormal potassium thiocyanate. In either case 1 Cc. of decinormal silver nitrate represents 0.003969 Gm. $CHCl_3$.

* Riban, Bull. Societ. Chim., 38, p. 108.

† If the per cent. of chloroform in the mixture is not even approximately known, 1 Cc. may be digested with 25 Cc. normal alcoholic potassium hydroxid solution for one hour, and the residual alkali determined with normal acid and phenolphtalein, when the Cc. of normal alkali which disappeared during the digestion multiplied by 0.02977 will give the amount of chloroform contained therein sufficiently close to judge the quantity to be taken for the actual determination.

‡ This acid need not be of any definite strength: an approximately normal acid is convenient.

Mr. Kebler presented in abstract the following paper, which was, on motion, duly referred :

THE IODOFORM REACTION IN ANALYSIS.

BY LYMAN F. KEBLER, B. S.

Ever since Lieben * discovered that certain organic groups, such as $CH_3.COH$, $CH_3.CH(OH)$, $CH_3.CH_2OH$, etc., when treated with iodine, in the presence of an alkali, would yield iodoform, numerous investigations have been made, with the view of utilizing this reaction for both qualitative and quantitative work. The result has been that several useful analytical methods have been worked out.

The unfortunate part with some of these methods is, that the very delicate reaction involved is not peculiar to any one substance, but may result from the presence of a number. It is, therefore, necessary to know approximately what substances are present, or the ultimate results are of little value. If a complicated mixture which contains a number of iodoform producing groups is involved, little more can be done than to estimate the amount of iodine consumed in the production of iodoform.

One of the most extensively used methods,† involving the above reaction, is that employed for the estimation of acetone in wood alcohol, commercial acetone, and mixtures in which the above may occur. But even in the case of commercial acetone we are unable to state more than that a certain amount of iodoform-producing bodies are present.

In connection with the above methods, it is generally stated that *ethyl alcohol will not react with iodine at the ordinary temperature to form iodoform in any alkaline solution.* The writer has given credence to this report by calling attention to it in one of his articles.‡ The test was hastily applied by him in cold weather, and no precipitation resulting immediately, it was concluded that former observations were correct. He has, however, found since *that the observation is not correct.* The process is, therefore, no longer of any value for the purpose of detecting acetone in compounds which are likely to contain any ethyl alcohol. This puts us in a somewhat disadvantageous position, inasmuch as the above method has been employed to detect the presence of wood alcohol, which generally contains some associated acetone in grain alcohol.

The writer accidentally observed that ethyl alcohol would be converted into iodoform in the proper medium at the ordinary temperature, while he was examining a sample of alcohol of questionable purity. The presence of wood alcohol was suspected, and the iodoform test for acetone was accordingly applied, with the result that wood alcohol was indicated. Ex-

* 1870, Ann. (Liebig) Supp., 7, 218 and 377.

† 1897, Am. Journal Pharmacy, *69*, 65; Allen's Coml. Organ. Anal., Vol. 1, 76.

‡ 1897, Am. Jour. Pharm., *69*, 72.

periments were then undertaken to establish the presence of wood alcohol, and in every case negative results were obtained. This, of course, necessitated an investigation as to the source of the failure. The first point taken up, and proved to be the only one necessary, was the statement that *ethyl alcohol would not form iodoform by the action of iodine in an alkaline medium at the ordinary temperature.*

A number of samples of pure and absolute alcohol were tried, and in every case iodoform was formed. The iodoform did not appear instantly in some cases, but in a few minutes turbidity began to form, and in an hour considerable precipitated iodoform found its way to the bottom of the container. By having present ample iodide in an alkaline solution, the ethyl alcohol can be promptly precipitated as iodoform at the ordinary temperature by the addition of chlorinated soda solution.

It should be mentioned in this connection that several workers in metabolic substances caution us to be particularly careful, in testing urine for acetone, to establish the absence of alcohol, since this product is prone to give the iodoform reaction, under the conditions laid down for acetone.

The writer has thus far been unable to devise a method which will enable us to positively establish the presence of acetone in mixtures containing ethyl alcohol, and thus in a measure replace what the above observation has rendered valueless.

MR. HINRICHS: Some years ago it became my duty to examine very closely into the matter of acetone in a patent case, and this so-called iodoform reaction was very thoroughly studied by me, and with quite notable results. I was in hope at that time to publish those results at an early date, but so far I have not been able to realize that hope. I can only say this, that the case is very complex, but when thoroughly analyzed it is absolutely certain, so far as my experience goes. There are present in the crude acetones of the market substances that do give iodoform apparently, but when examined, they are found not to do so. The iodoform test, when conclusive, must be followed up by an investigation of that so-called iodoform; it must be dissolved in ether and crystallized therefrom.

The Chair stated that rather satisfactory progress had been made at this session in the reading of the papers before the Section, and that if the members desired to suspend the reading of the remainder until to-morrow, he believed they could be disposed of then.

MR. KEBLER: Before we adjourn, I just want to say that the point Mr. Hinrichs has made is quite true, no doubt; but when we estimate acetone solutions, we generally estimate the amount of acetone by the amount of iodine consumed. Another point: I have distilled acetone in large quantities, and have found that the latter portion of the distillate, from the boiling point to 80 degrees Centigrade, produced iodoform. The substance which produced this iodoform was certainly not acetone.

Upon motion of Mr. Stevens, the Section then adjourned to 10 o'clock to-morrow (Friday) morning.

Second Session—Friday Morning, Sept. 20. 1901.

The Section convened at 10 : 30 a. m.

The Chair called attention to the small number of members in attendance, due to the holding of a session simultaneous with this of the new Section of Practical Pharmacy and Dispensing, and expressed his disapproval of simultaneous meetings of different Sections.

The Chair also stated that as the Section had already lost some valuable time in convening later than intended, it would hardly be profitable to read the minutes of the first session ; whereupon, Mr. Sayre moved to dispense with the reading, and it was so ordered.

The election of officers for the ensuing year was declared the next order of business, and the Secretary read the names of W. A. Puckner and Lyman F. Kebler as the present nominees for Chairman.

Mr. Puckner requested that his name should be withdrawn, as he might not be in Philadelphia next year.

Mr. Lyons: I regret that Mr. Puckner withdraws his name, but under the circumstances, I move that, as the present Secretary will not want to vote for himself, Mr. Puckner be requested to cast the affirmative ballot of the Section for Mr. Kebler for Chairman.

The motion was so put and carried.

Mr. Puckner announced that he had cast the ballot as directed, and the Chair declared Mr. Kebler duly elected.

The Chair stated that Mr. Joseph W. England, of Philadelphia, and Mr. Francis Hemm, of St. Louis, were the nominees for Secretary.

Mr. Hemm explained that it would probably be impossible for him to be in Philadelphia at the next meeting, and asked to withdraw his name.

Mr. Sayre thereupon moved that the Secretary cast the ballot of the Section electing Mr. England to the place of Secretary, and the motion prevailed.

The Secretary stated he had cast the ballot, and the Chair declared Mr. England duly elected.

Reports of committees were called for as being next in the order of business.

Mr. Lyons made a verbal report for the Research Committee, explaining that both the Chairman and Mr. Dohme, had been sick, but that a written report would be filed later. The report as finally submitted is as follows :

REPORT OF RESEARCH COMMITTEE.

To the Section on Scientific Papers of the American Pharmaceutical Association :

The year just closed has been in some respects an unfavorable one for scientific research work. The important task of revising the United States Pharmacopœia has made exacting demands, not only on the members of your Research Committee, but on every

pharmacist who has the ability and the will to do work for the profession he loves. On the other hand, the practical problems that have presented themselves in prosecuting this task, have suggested important lines of scientific research, which are likely to be followed with profit in the near future.

In lines of research already planned, however, there has been no lack of activity, and substantial results have been achieved.

Work on the mydriatic drugs — particularly on Scopola and Belladonna — has been continued with energy and diligence under the able direction of Dr. Rusby, who will present at this meeting a resume of the results already reached. Contributions to this symposium have been made by Professors Prescott and Schlotterbeck, of the University of Michigan, on the chemistry of the alkaloids of these two drugs; by Dr. T. Y. Sutphen, of Newark, N. J., on the action of solutions of these alkaloids upon the eye in ophthalmological practice; by Doctors F. Martin and W. A. Bastedo, on the effects produced by plasters made from the respective alkaloids, 67 of these having been used by them in their hospital practice; by Dr. Geisler, on the results of polariscopic examinations of these alkaloids; reviewing also the papers recently published by Dr. H. C. Wood, Jr., and by Doctors R. W. Wilcox and E. S. Bartley, on the physiological action of the alkaloids.

In the laboratory of the University of Michigan, in addition to the work above alluded to on the alkaloids of Scopola and Belladonna, research work has found expression in the following papers:

By A. B. Prescott, on the Detection of Methyl Alcohol in Ethyl Alcohol.

By J. O. Schlotterbeck and H. C. Watkins, on the Chemistry of the plant Stylophorum Diphyllum.

By J. O. Schlotterbeck, on the question, "Does Argemone Mexicana Contain Morphine?"

By J. O. Schlotterbeck, on Experiments with Fluid Extract of Sanguinaria.

By J. O. Schlotterbeck and C. R. Eckles, on the Histology and Development of the Fruit of Illicium Floridanum (illustrated).

By J. O. Schlotterbeck and C. R. Eckles, on the Development of the Seed of Argemone Mexicana (illustrated).

This list is certainly incomplete. It was the intention of the Chairman of this committee to make his report this year cover all the research work done in the various laboratories connected with Pharmacy Schools in the United States; but a serious illness which laid him aside completely from work for three months, imposed such a burden on him, in addition to that included in work for the Revision Committee, that the plan was not carried out. He will, with your permission, add to this report, before it is published, such further data as he may be able to collect.

The illness of Dr. Dohme prevented him from sending in any account of his own research work in time for this report, and this also, I hope, may be obtained before the Proceedings go into press.

From the University of Wisconsin I am able to report that the researches on the volatile oils have been actively prosecuted, with interesting and valuable results, some of which are embodied in papers that will be presented to this Section.

The following list represents the research work done in the laboratories of this institution:

By O. Schreiner, on the Specific Gravity of Pharmacopœial Volatile Oils.

By O. Schreiner and E. Kremers, on the Classification and Characterization of Sesqui-Terpenes.

By E. Kremers, on Quinhydrones as Plant Pigments (a preliminary report).

By R. Fischer, on the Alkaloids of Eschscholtzia Californica.

By R. Fischer, on the Alkaloids of Sanguinaria.

By R. Fischer, on the Alkaloids of Glaucium Flavum.

By A. E. Jensen and R. H. Denniston, on the Structure of the Stem Bark of Hamamelis Virginica L.

By A. G. Krembs and R. H. Denniston, on the Structure of the Stems of Myrica Gale L. and Myrica Cerifera L.

An unusual amount of independent research work has been done during the year, resulting in the contribution of numerous valuable papers.

Respectfully submitted, A. B. LYONS, *Chairman.*

The reading of papers was next called for, and Mr. Gordin presented in abstract his paper read by title only at yesterday's session, "The Alkametric Factors of Diacid Alkaloids." Applause followed the speaker's remarks.

Mr. Schneider presented the following paper in abstract:

THE GROSS AND HISTOLOGICAL CHARACTERS OF POWDERED COTO, PARACOTO, WINTERA AND CANELLA.

BY ALBERT SCHNEIDER.

The principal object of this study was to compare coto and paracoto bark with a view to determining some recognizable histological differential characteristics. Incidentally I have also included a study of the other barks named because of their commercial and medicinal value and because of their earlier association and confusion with coto bark.

Coto bark was introduced into England in 1873,* and into Germany in 1874† through the firm of Rudolph Martens, of Hamburg; but it is only within recent years that it has become known to the medical profession. Even at the present time it does not seem to be generally employed medicinally; in fact a large percentage of physicians know nothing about it, and only a comparatively few pharmacists keep the bark or its preparations. Another notable fact is that the physicians in country districts employ it most, especially the country practitioners of Iowa. This statement is verified by E. L. Mason, of the Parke Davis Co. It does seem that a drug of such undoubted medicinal value should be better and more generally known. Those physicians who have tried it are unanimous in pronouncing it almost a specific in various forms of diarrhœa.

The botanical origin of coto bark is still unknown. At first it was thought to be a cinchona and it was given the name "coto cinchona," but this was promptly recognized as a mistake. In Brazil the term coto ‡ is applied to the bark of *Palicurea densiflora*, Mart., of the Rubiaceæ, found useful in the treatment of rheumatism, but it is evident that this is not

* See Liebig's Annalen der Chemie, 199: 17–96, and Pharm. Journ. (III), 10: 521, 522. 1880.

† Archiv der Pharmacie, 4: 214; Pharm. Journ. (III), 6: 301–303. 1875.

‡ According to F. F. Newcome, coto in Spanish means *goitre*, and coto bark was used in the treatment of that trouble. (Pharm. Journ. (III), 24: 168. 1893.)

identical with true coto. Coto is said to be derived from a species of Drimys, namely *D. wintera* of the Magnoliaceæ, but this also is questioned. In any case, it does not clear up matters since Winter's bark is said to be from the same species and coto and wintera are certainly not identical. Coto was also for a time confused with canella.* (Pharm. Journ. (III), 24 : 163–171. 1893.)

Without going into a further consideration of the origin of coto bark, we shall now take up the discussion of the characteristics of the powdered barks named in the heading.

The histology of true coto bark † was first described by Dr. C. Harz in 1874. He called attention to the numerous large yellowish stone cells and the colored oil granules found in the parenchyma cells. The histology of coto, paracoto and wintera is also given in various works.‡

The following is a description of the powders :

COTO.

Color.—Cinnamon brown, which according to Dr. H. Kraemer's color scheme would be called Vandyke brown or perhaps raw sienna and umber. According to Prang's color scale it corresponds to the first tint of the fourth shade series of orange, indicated thus, $.3O_1$.

Consistency.—The powder has a slightly unctuous or oily feel, the particles clinging together quite well, which is partly due to its slightly oily nature, but more due to the presence of the elongated large sclerenchyma cells.

Odor.—Quite aromatic or spicy, and terebinthine or camphoraceous. Prof. O. Wall designates it as "aromatic, reminding of cinnamon and mace." According to Dr. Harz, the odor is aromatic, recalling cardamoms, camphor and cajuput oil, and occasionally to a less degree, cinnamon.

Taste.—Quite pungent and faintly bitter. Of course, as with most spicy substances, the taste and odor are associated, but the only sensation appreciated by the tongue is the burning, hot or pungent feel and a slightly bitter taste. There is no astringency.

Histology.—The most prominent and characteristic histological elements of coto, paracoto and wintera powders are the straw yellow or pale amber sclerenchyma cells. These form the yellowish streaks and dots visible to the naked eye in the crude drug. The cells vary in size and form ; some are greatly elongated (*a*), rectangular and large (*b*), typical (*c*, *d*, *e*), elongated but much smaller than *a*, as *f*. *g*, represents sclerenchymatous medullary ray cells, a characteristic of coto, paracoto and wintera. The

* See also Neues Repertorium für Pharmacie, II, 241, 1876.

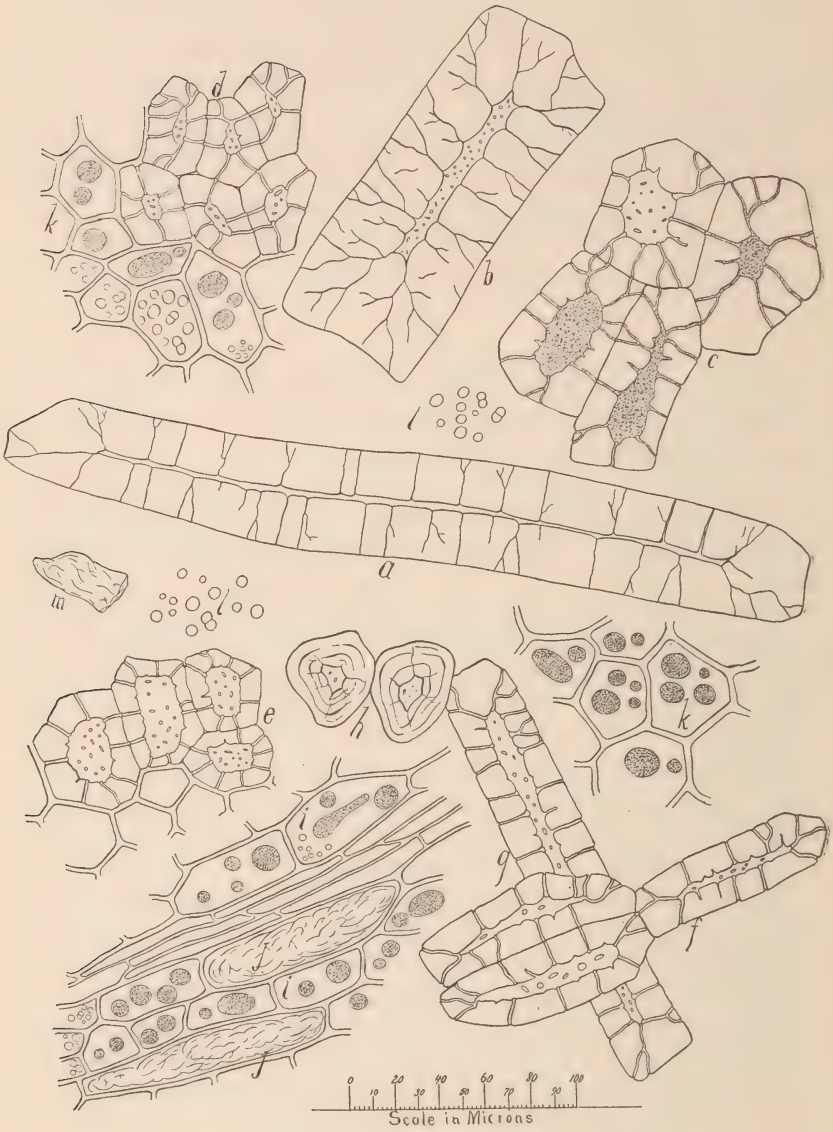
† By "true coto" is meant the bark which is at present recognized as coto.

‡ Labarde, J., Etude des ecorces de coto, Paris, 1886; Planchon et Collin, Les drogues simples d'origine végétale, Vol. II, 899, Paris, 1896; Vogl, A., Pharmacognosie, Wien, 1892.

parenchyma cells vary somewhat in size and form; some contain a little starch of mostly spherical granules, some two compound, hilum and strat-

COTO.

(*Plate I.*)



ification, wanting or indistinct (*l*, *k*). Certain larger parenchyma cells are filled with a pale amber resin (*j*) of the same color as the sclerenchyma cells and upon hasty or careless examination may be mistaken for

such. Most of the parenchyma cells contain a reddish-brown granular substance, but the characteristic contents are the reddish-brown, coarsely granular oil globules (*i*, *k*) ; these vary in size and form and are not found in the other barks to be mentioned.

The lamellation of the sclerenchyma cells is very distinct. In the dry cells there are distinct crevices at certain points and intervals (*h*) which become mostly reduced to uniformly fine lines after the cells have been soaked in water or clearing fluid. Pores are numerous, branching and quite distinct. The lumen and pores of some of these cells are filled with a brownish proteid substance (*c*).

Cork cells are scantily present in the powder and not characteristic or diagnostic. Medullary ray cells (excepting those which are lignified), phloem cells and most parenchyma cells are not diagnostic, and are pretty well broken.

Uses.—As already indicated coto bark is a very valuable remedy in the treatment of diarrhœa, both acute and chronic. It also alleviates the pain and griping due to the inflammatory conditions of the intestinal tract. In its earlier use it was also recommended for gout and rheumatism, but it has but little if any direct effect in these ailments. In small doses it acts as a stimulant tonic, similar to the spices in general.

PARACOTO.

Color.—Like coto, a cinnamon brown, but somewhat darker. Different samples of powder examined showed some variation in color, but they were as a whole somewhat darker than coto powders. According to Prang's scale of colors it is an orange of the fifth shade series or some tint of this orange. Three samples gave 5O, $5O_1$ and 6O.

Consistency.—Like coto, somewhat less oily.

Odor.—Like coto, somewhat less pronounced.

Taste.—Like coto, somewhat less pungent.

Histology.—Closely similar to that of coto. Sclerenchyma similar in form, size and abundance (*a*, *b*, *c*, *d*, *e*). Parenchyma cells and other cells similar, perhaps a little larger (*f*, *g*, *i*). Resin bearing cells (*h*) similar. The granular oil globules are wanting and this is the only reliable histological distinguishing characteristic between these two barks.

Use.—Similar to that of coto. Formerly it was supposed to be greatly inferior to coto. It does not contain cotoin to which the active properties of coto are supposed to be due. Within recent years paracoto has been given in place of or as a substitute for coto. Some manufactures state that the preparations made from paracoto are preferred and usually supplied when "coto" is ordered.*

WINTERA.

Color.—A cinnamon brown, almost identical with coto. According to Prang's scale it is the first tint of the fourth shade series of orange ($4O_1$).

Consistency.—Not oily or unctuous. Otherwise like coto.

* So stated by Parke, Davis and Co.

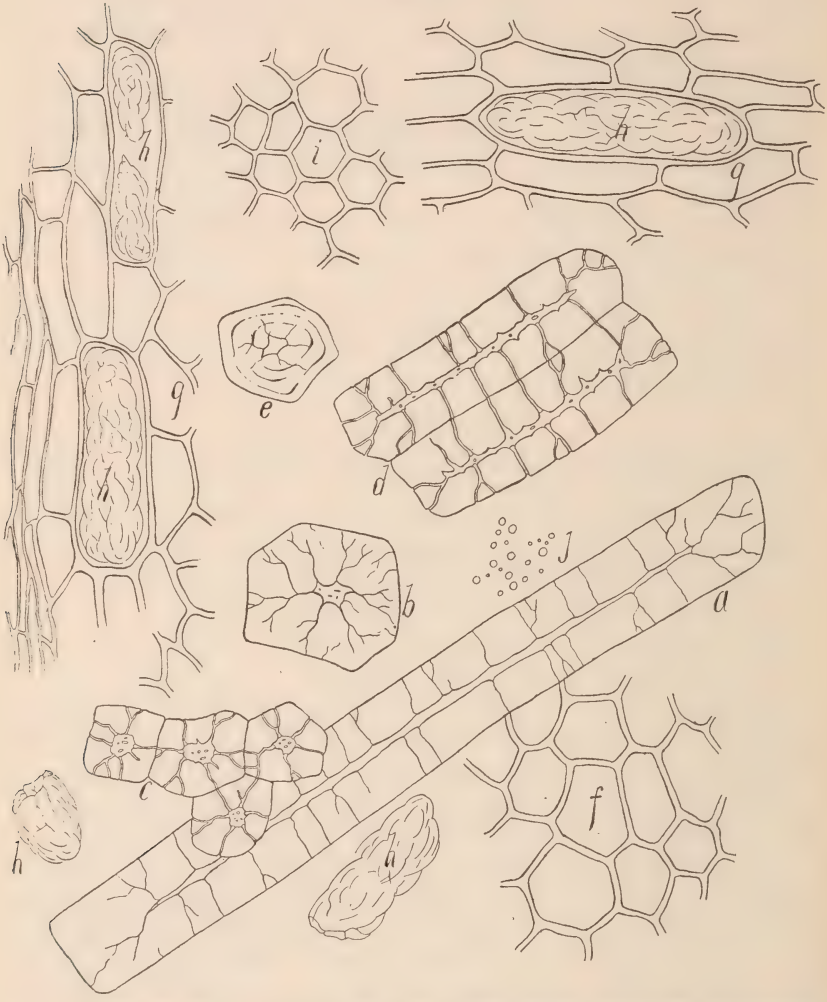
Odor.—Less aromatic than coto, more terebinthine or camphoraceous, recalling calamus.

Taste.—Very pungent, very faintly bitter. Astringency ascribed to it by Professor Wall was not noticeable in the specimens examined.

Histology.—The histological elements noticeable in the powder are

PARACOTO.

(*Plate II.*)

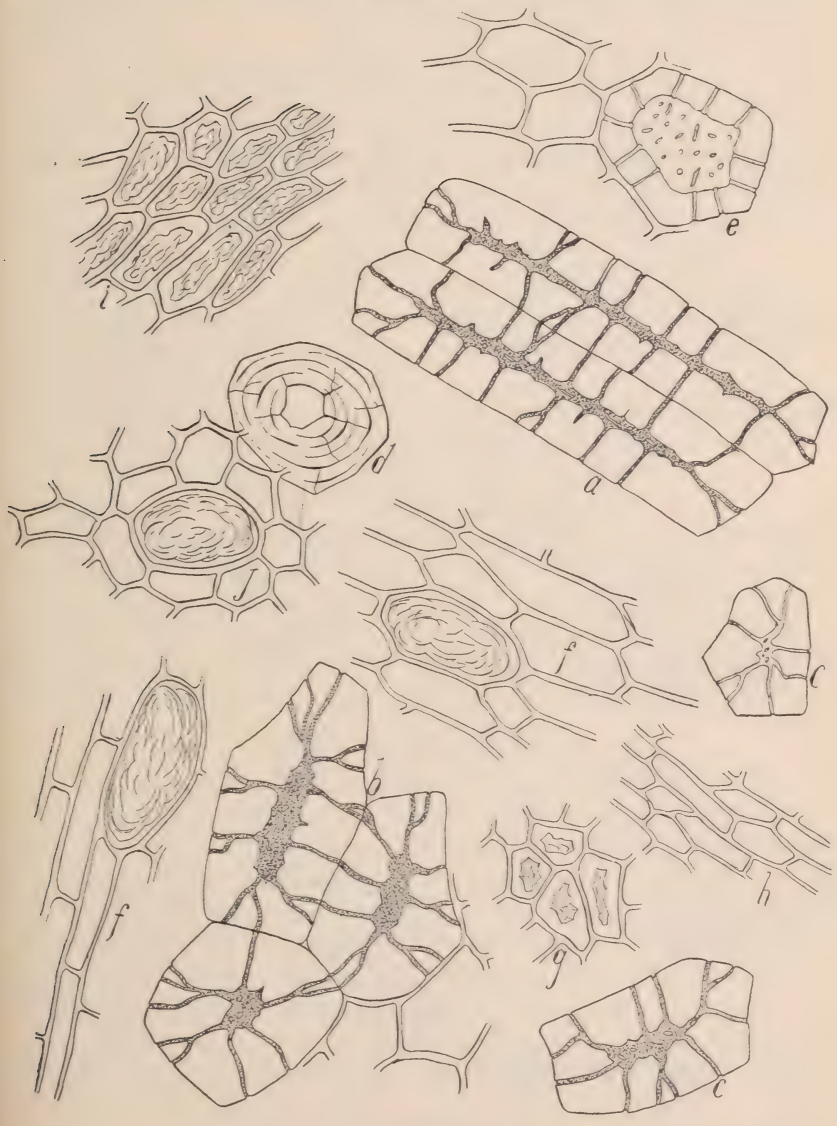


again similar to those of coto, but the large greatly elongated stone cells are wanting. The predominating sclerenchyma cells are elongated (*a*). A characteristic of the sclerenchyma cells is the prominent pores and the presence in lumen and pores of brownish proteid matter designated as protoplasm by some authors. Resin bearing cells as in coto and paracoto. Parenchyma cells and other elements not diagnostic.

Use.—Used as a stimulant tonic and antiscorbutic. In South America it is employed in the treatment of diarrhœa and indigestion. It is also used as a corrective with aloes to prevent the griping.

WINTERA.

(*Plate III.*)



CANELLA.

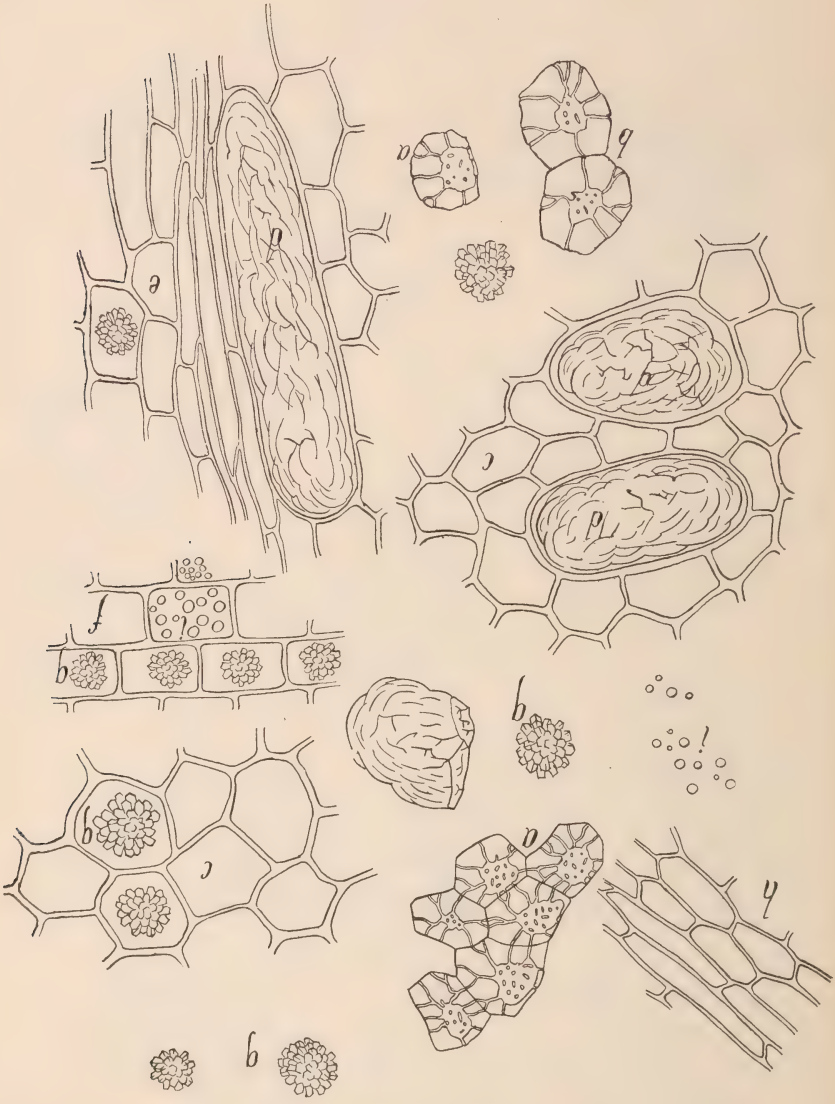
Color.—Pale yellow or pale straw-yellow, corresponding to the sixth tint of the primary yellow of Prang's scale (Y_6).

Consistency.—Dry powder, not oily or adhesive.

Odor.—Pleasant aromatic, resembling cloves, only more delicate, and terebinthine or camphoraceous when thoroughly crushed.

CANELLA.

(*Plate IV.*)



Taste.—Very pungent like cloves and somewhat bitter.

Histology.—Quite distinct from the other barks. Sclerenchyma cells fewer and less abundant and of uniform size. Most of them characterized

by the unequally thick walls (*a*) ; numerous cells bearing a bright golden yellow resin. Also very numerous cells bearing aggregate crystals of calcium oxalate. Small simple spherical starch granules.

Use.—Same as wintera.

To sum up briefly the histological comparison of the four vegetable powders described we find the following distinguishing characteristics for each :

1. *Coto.*—Granular oil globules.

2. *Paracoto.*—Absence of above granules.

Another difference between coto and paracoto is the behavior with nitric acid (concentrated or 40 per cent.). Place a pinch of the powders upon a slide and add a drop or two of the acid. The color of coto turns deep red while that of paracoto becomes yellowish, which finally turns to a dirty yellowish olive green.

3. *Wintera.*—No oil globules or very large sclerenchyma cells.

4. *Canella.*—Numerous bright yellow resin masses, crystals and unequally thickened sclerenchyma cells. Of course canella is at once distinguished from the other powders by its color.

The material studied was received from Lehn and Fink. Good samples of paracoto bark were obtained from Parke, Davis and Co.

DESCRIPTION OF PLATES.

The drawings are made on a uniform scale with the aid of Abbe's camera lucida. The lamellation and stratification of the sclerenchyma cells is not indicated excepting in *h*, pl. 1 ; *e*, pl. 2 ; *d*, pl. 3. Unimportant cell forms and cell-contents are either not shown at all or are left unexplained. The scale in microns found with pl. 1, is of course also to be used in measuring the elements figured on the other plates.

Plate I.—Coto.

a, large, elongated sclerenchyma cell. The one figured is not one of the largest to be found. *b*, large, broad sclerenchyma cell. *a* and *b* extend in the long axis of the bark, lying parallel to each other or united end to end, forming the yellowish streaks or fibres visible to the naked eye. *c*, *d* and *e* are quite typical sclerenchyma elements, distributed in groups, also singly, through the outer layers of the bark and about the fibres above referred to. *f*, smaller elongated sclerenchyma ; *h*, sclerenchyma showing lamellar crevices before becoming permeated with moisture ; *g*, sclerenchymatous medullary ray cell ; *i*, *k*, parenchyma cells bearing granular oil globules ; *j*, resin-bearing cells ; *l*, starch granules ; *m*, fragment of resin.

Plate II.—Paracoto.

a, large sclerenchyma as in coto ; *b*, *c*, *e*, isodiametric typical sclerenchyma ; *d*, smaller elongated sclerenchyma cells ; *f*, *i*, parenchyma cells ; *g*, parenchyma cells in longitudinal view with resin (*h*) ; *j*, starch granules.

Plate III.—Winter's Bark.

a, elongated sclerenchyma; *b*, *c*, *d*, *e*, typical isodiametric sclerenchyma, varying in size and thickness of walls; *f*, parenchyma cells in longitudinal view bearing resin; *g*, cork cells bearing a bright reddish brown coloring matter; *h*, empty parenchyma cells; *i*, parenchyma bearing a brown granular substance; *j*, transverse view of parenchyma cells bearing resin.

Plate IV.—Canella alba.

a, group of sclerenchyma cells, walls unequally thickened; *b*, typical sclerenchyma; *c*, transverse view of parenchyma cells; *d*, resin bearing cells; *e*, longitudinal view of parenchyma; *f*, crystal (*g*) and starch (*i*) bearing cells, longitudinal view; *g*, crystals and crystal bearing cells; *h*, parenchyma cells; *i*, starch granules.

MR. LLOYD: It seems to me that Mr. Schneider has emphasized that which, in my opinion, is peculiarly useful to the scientist. He has summed up the differences between these barks and brought them out very clearly. As a rule, such pictures carry with them very little that is useful, unless the distinctions are pointed out—it is the distinction that is of use in science; he has drawn these distinctions so clearly that that feature should have particular attention called to it.

MR. HALLBERG: There is a statement here in the introductory remarks that I think ought to be corrected. In the second paragraph, beginning in the second line, "but it is only within recent years that it has become known to the medical profession," referring to coto bark. It is not a matter of great consequence, but that is incorrect. Twenty years ago coto bark was used quite extensively, and it is only of late years that it has fallen into disuse. It has been asserted that the para-coto bark is of equal value with the coto bark. I had considerable experience with it years ago, and it was rather the opinion of medical men that the genuine coto bark was difficult to obtain, and that the para-coto bark was equal to it in every respect. Years ago we used to have an epidemic in Chicago known as winter cholera. I have not had any experience with it for many years until here in St. Louis recently (laughter), and the best remedy was this coto bark in about ten-grain doses. It was exceedingly valuable in that connection.

MR. OLDBERG (in the chair): I presume many of us would regard twenty or twenty-five years as very recent in the history of drugs.

MR. SCHNEIDER: That is really what I had in mind—about fifteen or twenty years. According to what information I could get, it was first known in Europe about 1873 or 1874, and of course that is quite recent in the history of science. Science is very slow in its operations.

MR. HALLBERG: I being so young myself, feel that that was a long time ago.

THE CHAIRMAN: We have a paper by Geo. R. Pancoast and Lyman F. Kebler on the "Oils of Cinnamon and Cinnamic Aldehyde," which will be read by title only, as the nature of it renders it desirable that it should be studied in print.

The text of the paper was as follows:

CINNAMON OILS AND CINNAMIC ALDEHYDE.

BY LYMAN F. KEBLER AND DR. GEO. R. PANCOAST.

There is little doubt in the average mind as to which of the cinnamon oils possesses the most desirable odor, yet the various pharmacopœias are not in accord as to which is the best suited for pharmaceutical purposes. The 1880 United States Pharmacopœia recognized both oil of Ceylon Cinnamon and Chinese Cinnamon Oil, while the 1890 recognizes only the latter. The 4th edition (1900) of the German Pharmacopœia requires oil of cassia to be used in its official preparations; while the 1898 British Pharmacopœia recognizes oil of Ceylon Cinnamon.

Oil of Ceylon Cinnamon undoubtedly possesses the finest aroma, but we do not think, judging from the price, that it is four times as good as oil of cassia. In fact, we believe oil of cassia is a close second to oil of Ceylon Cinnamon, and in view of the existing conditions, the framers of the 1890 United States Pharmacopœia deserve to be commended on their choice

Ceylon cinnamon oils are generally prepared from waste materials resulting in the preparation of the bark for the market, such as peelings, shavings, and other fragments collectively called "chips." It seems that Ceylon cinnamon oil is rarely a pure distillate from such "chips"; but generally contains some leaf oil added intentionally, or leaves may have been mixed with the bark during the distillation; but this sophistication is mild compared with the adulterants met with in oil of cassia.

The color of the cinnamon oils may vary from yellowish to brownish and the cassia sometimes verges even to reddish.

Oil of Ceylon cinnamon passesses a fine delicate aroma, and a spicy, sweet burning taste. Its specific gravity lies between 1.024 and 1.040 at 15° C., and contains from 65 per cent. to 75 per cent. of cinnamic aldehyde.

Oil of cassia has a cinnamon-like odor, a sweet, burning taste, like the above, and its specific gravity is practically the same as that of cinnamon leaf oil, namely, between 1.045 and 1.065 at 15° C. Cinnamon leaf oil possesses the mingled odor of cloves and cinnamon, the clove odor being due to the high percentage content of eugenol (70 to 90 per cent.).

Besides the specific gravities and aromas, there are a number of tests given in the various pharmacopœias to assist in establishing the purity of an oil, such as the solubility in different strengths of alcohol; tests for the presence of oil of cloves, petroleum, colophony, phenol, and the reaction of these oils with a saturated solution of sodium bisulphite.

In March, 1901, there were five grades of oils quoted in the Hong Kong market; namely, 60 to 65 per cent., 65 to 70 per cent., 70 to 75 per cent., 75 to 80 per cent., and 80 to 85 per cent. of cinnamic aldehyde. The above quoted oils and our experience would lead us to conclude that the aroma and the percentage content of cinnamic aldehyde are at present the most essential points to be considered in examining oil of cinnamon.

Occasionally an oil is met with that is adulterated with both resin and kerosene oil, as the following will show: In April, 1890, an oil marked Chenug King was examined with the following results: Specific gravity, 1.070; optical rotation at 18 degrees C. plus 5 degrees and 45 minutes, was soluble in 2 to 5 parts 70 per cent. alcohol, contained 69 per cent. cinnamic aldehyde, 12 per cent. resin, and on submitting the oil to fractional distillation, the first portion of the oil that came over showed the presence of kerosene.

In 1896 Messrs. Siemssen & Co. of Hong Kong sent two men through the cassia distilling districts of China to gather samples of the various oils, and an analysis of these showed that little if any adulteration is practiced at the source of production; but the blame was placed upon the intermediary traders. The oil is generally transported from the interior in tin cans by way of Macao to Hong Kong, where it is transferred to leaden canisters holding 7½ kilos of oil. These oils almost always contain a little free cinnamic acid, which imparts an acid reaction to the oil and acts on the leaden canisters, forming lead cinnamate. This compound is insoluble in the oil and constitutes the bulk of the crystalline sediment usually found in the leaden containers.

An examination of a number of samples of the various commercial oils and two samples of synthetic cinnamic aldehyde all secured in the market, gave the following results:

Kind.	Specific Gravity at 15 C.	Per cent. of Cinnamic Aldehyde.	Solubility in 70 per cent. alcohol.
Synthetic cinnamic aldehyde..	1.0516	98 per cent.	equal volume.
Synthetic cinnamic aldehyde..	1.0537	96 per cent.	equal volume.
Cassia Rect.....	1.0573	75 per cent.	1–2
Cassia Redist	1.0490	65 per cent.	1–2
Cassia Nat. 50–55 per cent. ..	1.0543	40 per cent.	not in 1–10
Cassia Regular	1.0633	76 per cent.	1–2
Cassia 80 per cent.....	1.0574	62 per cent.	1–2
Foohey Suey.....	1.0514	52 per cent.	1–2
Cassia	1.0554	81 per cent.	1–2
Cassia	1.0550	80 per cent.	1–2
Cassia	1.0559	71 per cent.	1–2
Cassia	1.0607	70 per cent.	1–2
Ceylon, Heavy	1.0447	40 per cent.	1–2
Ceylon, True.....	1.0323	53 per cent.	1–1
Cinnamon Leaf	1.0522	12 per cent.	equal volume.
Cinnamon Leaf	1.0574	10 per cent.	equal volume.

The artificial cinnamic aldehydes tested up very well in every respect. One sample in our possession for about two years, kept in a closed amber bottle, had undergone considerable decomposition with the liberation of free cinnamic acid. This would indicate that the above aldehyde, like benzoic aldehyde, is prone to undergo spontaneous changes in process of time.

The cassia oils, on the whole, were fairly good, and generally contained the amount of cinnamic aldehyde claimed for them. Numbers 5, 7 and 8 are notable exceptions. The Ceylon oils fell below the standard (65 to 75 per cent.) percentage of cinnamic aldehyde, while the two samples of cinnamon leaf oils were of average quality.

At request of the Chair, Mr. Lyons presented in abstract the following paper from H. H. Rusby, of the Research Committee, upon Scopola and Belladonna, specimens of the plants discussed being exhibited to the audience before the reading of the paper:

REPORT FROM RESEARCH COMMITTEE UPON COMPARATIVE PHARMACOLOGICAL STUDIES OF SCOPOLA AND BELLADONNA.

COMPILED BY H. H. RUSBY, M. D.

At the meeting of this Association two years ago, the subject of the introduction of the rhizome of Scopola Carniolica to the Pharmacopœia as a substitute for, or an alternative of, Belladonna root or leaf, especially in the manufacture of the plaster, was taken up by the writer, in reply to a query by the Committee on Scientific Papers. It was then shown that although such use of Scopola was universal, both in this country, and in Europe, yet we were without any definite and accurate information for enabling us to judge as to whether or not such action was desirable. It was further undertaken, on behalf of our Research Committee, to induce pharmacologists to take up the several departments of such an investigation. We have now to report the following progress in this work:

Several different importation lots of Belladonna root were purchased and examined piece by piece, every portion of foreign or doubtful matter being rejected, and the whole mixed. The result was a product which, when assayed, showed the very high yield in the fluid extract of 0.93 per cent. of total alkaloid. A similar course was pursued with Scopola. In this case, all the root portions were excluded, because of their very close similarity to Belladonna root, and our desire to preclude absolutely the possibility of any admixture. The result was a product yielding in the fluid extract 0.55 per cent. of total alkaloid when assyaed by the same person, following the same process, and at the same time as with the Belladonna.

These two lots of drugs were then sent to Messrs. Parke, Davis & Co., with an explanation of the object, and a request that they would have them manufactured into tinctures, fluid extracts, extracts, and total alkaloids as hydrochlorides, in their analytical department, with all possible care. In response to this request, the firm assigned the work to Dr. John M. Francis. Upon delivery of the materials, Dr. Francis explained his methods of procedure in a report which will be here appended. This report shows that the most scrupulons pains were taken, as regards temperature and materials, to avoid any loss or transformation of alkaloids.

Of these products, the following disposition was made. A considerable portion of the total alkaloids was delivered to Prof. A. B. Prescott for chemical study, and he, associated with Prof. Schlotterbeck, will present a report to-day. Prof. Prescott also undertook to secure the performance of some physiological work in the medical department of the University of Michigan, and a report of this may be presented in the same connection. Another portion of the alkaloids was supplied to Dr. J. F. Geisler, chemist to the New York Mercantile Exchange, for polariscopic study. Dr. Geisler has communicated his results to Prof. Prescott, who will doubtless discuss them in his report. In the meantime, Dr. Geisler's report is also filed herewith. Another portion of them was supplied to Dr. H. C. Wood, Jr., for physiological experimentation. Still another portion was made up into 1 per cent. solution for experiment in eye practice and supplied to Dr. T. Y. Sutphen, of Newark, N. J., and to Dr. E. H. Bartley, of the Long Island Hospital, Brooklyn. Another portion was made up into $\frac{1}{500}$ grain tablets of hydrochlorides, and these tablets were supplied to Doctors H. C. Wood, Jr., W. A. Bastedo and E. H. Bartley. In connection therewith, a quantity of the pure sulphate of atropine and of the pure sulphate of hyoscyamine were obtained from Messrs. Merck & Co., and were made up into similar tablets. These were given to the same experimenters in order to compare their effects with those of the total alkaloids contained in the tablets above mentioned. This attempt, however, proved a failure, owing to the fact that the hyoscyamine tablets were found to be almost without any physiological action. This fact should not be lost sight of. The widest discrepancy exists between published reports of the action of hyoscyamine. It has been assumed that in those cases in which it has been reported inactive and weak, the alkaloid was impure, and that a pure alkaloid would act very similarly to atropine. Messrs. Merck & Co., are, however, very sure that the hyoscyamine sulphate supplied upon this occasion was chemically pure, and the question is suggested whether, after all, hyoscyamine is not an inactive alkaloid, and when it seems to be active it is due to more or less of an admixture of atropine or other base.

Experiments with the tinctures disclosed the fact that they were too weak to be generally useful in experimentation and they have been scarcely employed. Besides the alkaloids, as above stated, experiment was therefore restricted to the fluid extracts and extracts as follows:

Fluid extracts were supplied to Doctors R. W. Wilcox, E. H. Bartley and W. A. Bastedo, and were applied externally, either in the form of the official liniment or pure. The extracts were used in the form of the ointments and the plasters. The fluid extracts, as employed, were of equal strength as to their percentage of drug, but of markedly unequal strength, as above shown, in their alkaloidal percentage, so that those employing them found it necessary to make allowances in the amounts used or in their estimates of the effects. The plasters, upon the contrary, were made

up with such proportions of extract to mass as caused the finished plasters to be of equal alkaloidal strength; that is, there was an equal amount of alkaloid per square inch of plaster in each case. There were five different lots of plaster as to composition, namely, belladonna root made with the rubber combination mass, belladonna root made with the official mass, belladonna leaf made with the official mass, scopola made with the rubber mass, and scopola made with the official mass. Of each kind some were made porous and some were made plain, while there were several different sizes of plaster of each kind.

Since no leaf extract of the belladonna was specially prepared for me, I purchased a quantity having a guaranteed assay by a responsible maker, and adjusted its plaster to the same alkaloidal strength as the others. These plasters were made by myself, with the greatest pains to secure uniformity.

In supplying these several articles to those who were to study them, no information was supplied in any case as to the identity of the article, other than that certain of them represented belladonna and others scopola. They were simply lettered and the reports were called for under the respective letters. When in these reports the names of the drugs were referred to, they were inserted later for your information. In the case of the plasters, instructions were given as to how they were to be paired, that is, which plaster it was desirable to compare with which other, and caution was given as to subjecting both of each pair to exactly the same condition of test.

The above explanations, it is believed, give full information concerning the conditions of the tests. As to the reports upon them, it is to be stated that some of these reports have already been published. They will therefore not be here repeated, but abstracts of their conclusions are compiled, and the publications are cited and copies are filed with this report.

It is not out of place to caution the members of the Association against placing confidence in the various distorted and in some cases falsified publications which have been made for commercial purposes in regard to the investigations of these two drugs. Thus, the country was at one time flooded with circulars declaring that scopola should not be used because it was such a dangerous and deadly poison, and a few weeks later this was followed by another one from the same source condemning it because it was an inert substance. The truth is, that the relative merits of almost any two drugs of similar character are difficult to establish. This natural difficulty is enormously increased in the case of drugs whose active constituents are so very unstable and in which the method of employment is subject to so many conditions which tend to obscure or confound the causes of the difference in action, as is true of belladonna and scopola. It is perhaps too much to ask of the ordinary enterprising commercial establishment that it will refrain from seeking any advantage that it may

be able to secure from premature claims, but it is not too much to hope that the members of this Association will be cautious in drawing their conclusions.

Dr. H. C. Wood, Jr. (*Therapeutic Gazette*), has published a lengthy report of his experiments upon frogs and rabbits. Although some experiments were made with both tinctures and fluid extracts, the use of the alkaloids was found to give the clearest results and was depended upon for the conclusions. His conclusions are that the physiological actions of the two drugs are so closely similar as to be practically indistinguishable. He concludes as follows: "Like belladonna, scopola elevates the blood pressure, paralyzes the pneumogastric nerve, is primarily a stimulant of the respiratory center, and in fatal doses kills by asphyxia. In the frog, it is a paralyzant to the spinal cord and to Setschenow's center, and when brought in direct contact with a motor nerve lessens its function. The dominant alkaloids of the two plants, however, are probably not identical, since we find the scopola apparently a little more depressant to the spinal cord, and distinctly more toxic."

Dr. E. H. Bartley, in connection with his associate, Dr. Rushmore, of the Long Island Hospital, experimented with 1 per cent. solutions of the alkaloids in eye practice, with the tinctures, with the solid extracts made into 10 per cent. ointments, and with the fluid extracts applied externally. His conclusions are here presented.

REPORT OF DR. E. H. BARTLEY, OF BROOKLYN, N. Y.

I had the total alkaloidal hydrochlorides tested at the Eye and Ear Hospital by Dr. Rushmore, with the following results: One per cent. solutions were carefully prepared by myself and submitted for trial.

They were tried upon eight patients, using A. in one eye and B. in the other.

(B) was clearly acting in 10 minutes, and in 20 minutes there was wide dilatation.

(A) No effect in 10 minutes, moderate in 20 minutes.

(B) Paralysis of accommodation in 1 hour.

(A) Paralysis of accommodation in 2 hours.

In a child of 7 years of age poisonous symptoms came on after 5 instillations at 15-minute intervals with A. In a child of 4 years marked constitutional symptoms were produced by A. after 3 instillations at 15-minute intervals.

The effects of (B) lasted about ten days.

The effects of (A) lasted about twelve to fifteen days.

Summary: (B) acted more promptly than (A) and passed off sooner. (A) gave more constitutional effect than (B) in children.

NIGHT SWEATS.

Tinctures: Three cases. Both failed in one (atropine, agaricin, and picrotoxin failed in same case). Both equally efficient in two cases.

Solid extracts: Made into ointment 10 per cent.

Rheumatic joints. Applied externally, no difference. Both of like effects.

Applied to breasts to dry the milk after weaning. Patient certain that the scopola used on right breast acted better than belladonna used on left breast.

Fluid extracts: Used in a case of sweating feet. Patient reported scopola the best, after repeated trials. He used the one on the right foot, and the other on the left. Both were diluted by myself and applied in same strength.

As far as tried, therefore, the actions of the two drugs have shown slight difference in some respects. The most reliable effects were those obtained at the Eye and Ear Hospital. They were watched carefully and the results are definite. The effects of the tinctures on night sweats, so far as they go, show no difference. No difference could be observed in anodyne effects, wken used in the form of ointment. In sweating feet (one case) and in drying the milk (one case) scopola seemed to produce more effect. I do not feel that these results are sufficient to be regarded as very conclusive, and I shall continue to experiment with them as occasion may arise. It is not easy to try such remedies, as we do not like to push such potent agents too far. Then, suitable cases do not present themselves every day, and when they do, not every patient is reliable as an observer. In some cases I have obtained no reliable report and have not recorded it.

(Signed), E. H. BARTLEY.

Dr. Bartley subsequently reported that experiments with the tinctures made by the Kings County Hospital showed no appreciable difference in their action; also that no dilatation of the pupil could be secured through the application of the fluid extract in the vicinity of the eye.

Dr. R. W. Wilcox, of New York, assisted by Doctors H. D. Furniss and H. J. Van Wagenen, has made a thorough study of the comparative action of the liniments, his reports being published in the "Medical News," March 2, 1901. He concludes: "My work has established but one fact —Scopola rhizome as fluid extract incorporated into a liniment is devoid of therapeutic action, and should not be substituted for Belladonna root." "In order to determine if the camphor in the liniment interferes with the production of symptoms from the use of scopola liniment, a new series of observations has been commenced, which will be the basis of a later report."

This second report promised by Dr. Wilcox has since been published in the "Medical News" during the latter part of August, the results being in a general way confirmatory of those of his first paper, though the effects of Scopola upon temperature were about half those of Belladonna; upon the pulse, about a sixth; upon the respiration, about double. Dr. Wilcox concludes as follows from this set of experiments: "The results obtained show that while the camphor" (in the first experiments) "did not interfere with the results, so far as the Scopola-rhizome fluid extract was concerned, it certainly aided in the absorption of the active principles of Belladonna-root. This second series of experiments confirms the first, and the conclusion, so far as Scopola, still obtains."

Dr. T. Y. Sutphen has furnished us with a preliminary report, his experiments being interrupted by a European trip, upon the 1 per cent. solutions used in eye practice. Since this report has not been published, it is here presented somewhat fully.

"Neither acts as an irritant to the conjunctiva, nor seems to cause any pain. There is no appreciable effect upon the cornea, in regard to softening of the epithelium. *B.* This is much more rapid in dilating the pupil than *A* (Belladonna H. H. R.); (*B* is Scopola, H. H. R.); the former in

from 10 to 20 minutes; the latter, 20 to 30, or even 40 minutes. Tension of globe slightly increased with use of *B* in some cases. No alteration in intra-ocular appearance noticed in either. In one case the pupil was more or less dilated until fourteen days after use of *B*. Mild poisoning symptoms occurred in one case in which *A* was used in one eye and *B* in the other.

Dr. W. A. Bastedo was supplied with fluid extracts, extracts, alkaloidal tablets and plasters. His elaborate report upon the plasters is here presented. So much of his time was devoted to this one subject as to forbid the presentation at the present time of a definite report upon the other preparations. However, in a report of progress he informs me that his use of the two fluid extracts applied externally, pure and in the form of liniments, both showed activity.

BELLADONNA AND SCOPOLA PLASTERS.

BY W. F. MARTIN AND W. A. BASTEDO.

In all, sixty-seven plasters were used upon patients of very different temperaments, but all suffering from tubercular diseases. The neurotic element figures very largely in the problem, as does also the mechanical limitation of motion by the plaster. With some of the patients almost anything done gave relief. In concequence of these factors there is great difficulty in summing up the evidence in the favor of one plaster or another. No essential difference was noted between porous and plain plasters.

Of *A* plasters—(This was Belladonna root made with the rubber mass H. H. R.); fifteen were used, ten being left on 24 hours, two 48 hours, two 72 hours, and one 120 hours. The conditions treated were lumbar pains and adhesive pleurisy. In one neurasthenia the pain was quickly relieved; in another neurotic case, there was no relief at all. In seven pleurisy cases there was moderate relief after from 6 to 24 hours. In three cases of exacerbation of the pleurisy, there was none, or only slight relief. One case of lumbago improved after 10 hours.

The *B* plasters (this was of belladonna root made with the official mass, H. H. R.) proved more efficient, and in nine cases all had some relief. In three this was obtained in four to eight hours and there seemed to be no return; in two the pleuritic pain was lessened, but in one returned in ten hours, and, in the other, was only slightly relieved after twenty-two hours. The latter was extremely neurotic. In one case of lumbago, a plaster gave relief in five hours, but the pain returned the next day. A second plaster was followed by relief for five days. In one case with a few adhesions over a large cavity in the lung, and with sharp pain on breathing, there was much relief from the plaster, but more relief from strapping the chest tightly.

The *C* plasters (this was belladonna leaf made with the official mass, H. H. R.) were more or less successful in the nine cases in which they were used. Six had relief in six to eighteen hours with practically no return of pain; one obtained relief but the pain returned the next day; two with lumbar pain were relieved but slightly. Six of these plasters were applied for 24 hours, and three for 72 hours.

Of seven *D* plasters (this was scopola made with the official mass, H. H. R.) used, two pleurisies and one lumbago were not relieved. Three others gave some relief for pleuritic pain in six to eighteen hours. One plaster applied 72 hours gave complete relief in a left shoulder pain accompanying rheumatoid arthritis. One of the plasters which relieved pleuritic pain was also applied for 72 hours, but the other *D* plasters for only 24 hours.

There were twenty-seven *E* plasters (this was the scopola made with the rubber mass, H. H. R.) used, and the results obtained were quite variable. Pleuritic pain was much relieved but not completely, and in three instances strapping the chest tightly was of more value. In most, some relief was noticed in from four to eight hours. One case of lumbago experienced no good effect, while two others obtained complete cessation of pain. One man with lumbar pain had the plaster applied twice with complete relief in each case. These plasters were kept on for variable periods, from 24 to 96 hours. In one case of rheumatoid arthritis with sharp pain in left shoulder, there was much relief at first, but not so much as that obtained from a *D* plaster.

Our conclusions from the above were arrived at without knowledge of the contents of the plasters, each plaster being simply lettered by the Research Committee "C" of the United States Pharmacopœia Committee of Revision. A (Bel. Rt. Rub., H. H. R.) were thought to have the least value, E (Scopola, Rub., H. H. R.), and D (Scop. Off., H. H. R.) to be of fair efficiency, and B (Bel. Rt. Off., H. H. R.) and C (Bel. Leaf. Off., H. H. R.) to be best of all. In no case were symptoms of belladonna poisoning noticed.

In commenting upon this summary, it will be noted, first, that both the belladonna and the scopola plasters proved of fair efficiency, thus setting at rest, so far as this one report goes, both the general claim that belladonna plasters are worthless, and the special claim that this is true of such plasters when made from scopola; second, that belladonna, both root and leaf, show a slight superiority over scopola, in the form of the plaster; third, that the official mass showed a superiority to the rubber in the case of belladonna, the reverse being true in the case of scopola. As to the last subject, it is subject to some modifying considerations. Only seven official mass scopola plasters were used, against twenty-seven of the same with rubber mass. A study of the percentages hardly serves to show the superiority of the latter form, and in one case, where both were used on the same patient, the official form was notably superior. We are inclined to believe that the summary, as a whole, should favor the official as against the rubber mass.

The undersigned desires to lay particular emphasis upon the ability, conscientiousness and carefulness of Dr. Bastedo as an experimenter, and believes this report to be of special value as a contribution to our knowledge of the action of these plasters. At the same time, many more similar trials will be required to settle the question involved.

Summarizing the above conclusions of the different experimenters, we get the following synopsis:

Alkaloids, Percentage of.

Papers presented two years ago and confirmed by many subsequent publications, establish the fact that belladonna root is extremely irregular in alkaloidal percentage, ranging from 0.2 per cent. to above 1 per cent., while scopola is as strikingly uniform, rarely varying a tenth of a per cent. from 0.55.

Alkaloids, Character of.

Profs. Prescott and Schlotterbeck:

The studies of these gentlemen indicate that the alkaloid of belladonna is more than half hyoscyamine, that of scopola almost wholly hyoscyamine.

Dr. Geisler's experiments indicate that the alkaloid of belladonna which he used is farther from being pure atropine than that of scopola. We have no doubt that the finished work of Messrs. Prescott and Schlotterbeck will clear up this discrepancy.

Alkaloids, Action of.

Dr. H. C. Wood:

Systematic physiological action identical in kind, differing slightly in degree, the scopola slightly more depressant and more toxic.

Dr. E. H. Bartley:

Effects upon the eye.

Scopola acts more promptly and its effects pass off sooner.

Systematic effects greater from the belladonna.

Dr. T. Y. Sutphen:

Effects upon the eye.

Neither irritant to conjunctiva, nor productive of pain, nor tending to soften epithelium of cornea, nor affecting intra-ocular appearance.

Scopola much more rapid in dilating the pupil and slightly increasing tension of globe. No comparison as to duration.

Poisonous symptoms negative, since one was used in one eye, the other in the other.

Tinctures.

Dr. E. H. Bartley:

Both equally efficient, except in one case, where all drugs failed.

Fluid Extracts.

Dr. R. W. Wilcox:

Belladonna is active, scopola is nearly inert, when used by inunction, either in the form of the pure fluid extracts or of the official liniment.

Dr. W. A. Bastedo:

Both fluid extracts are active, but comparison has not yet been concluded.

Dr. E. H. Bartley:

Scopola much more active in treating sweating feet.

Solid Extract used as Ointment.

Dr. E. H. Bartley:

Both equally efficient used upon rheumatic joints.

Scopola much better applied to breasts to dry the milk after weaning.

Dr. Bartley subsequently reported that both ointments showed the same results when applied near the eye.

Solid Extracts used in Plasters.

Dr. W. A. Bastedo:

Both of fair efficiency, the scopola slightly superior. No poisonous symptoms from either.

Incidentally the official mass was believed to be better than the rubber combination mass, and the porous plaster was believed to show no difference of action from the plain.

GENERAL CONCLUSIONS.

In conclusion, the general bearing of this series of reports is that whereas, administered internally, scopola is more depressing and toxic, yet administered externally it shows almost no tendency toward absorption to the extent of producing systemic effects, but does act locally with promptness and efficiency; in eye practice more promptly and less prolonged, and more efficiently in all the other ways experimented with, save that of the plasters, where it is slightly less efficient than the belladonna. Finally, scopola exhibits a distinct superiority over belladonna root in its greater uniformity of alkaloidal percentages.

Report from Dr. F. M. Francis, upon Delivery of Belladonna and Scopola Preparations.

These extracts have all been made with the greatest possible care. The work has not been done in the manufacturing department but in the analytical department, where all the details of the process could be carried out under my own supervision. The drugs were extracted by cold percolation, and the evaporation was done in glass flasks under vacuum pressure so as to avoid by overheating any chance of converting the less stable alkaloids into atropine. You can safely take it for granted that these extracts contain the active principles in the original state in which they existed in the drug. In the handling of these alkaloids, as in the manufacture of the fluids, I have been very careful, employing only potassium carbonate solution as an alkali and extracting with dilute sulphuric acid water, chloroform and 94 per cent. alcohol. You may, therefore, rest assured that you have not a lot of converted alkaloids in these products.

In this package of tablet triturates you will find enclosed two vials containing the remaining portion of the two batches of alkaloids in the form of hydrochlorides. You will note that the alkaloids are in the form of a very heavy liquid with the exception of a small portion in the bottom of the vials, which is a part of that which was dried on glass for the preparation of the tablets. I did not think it wise to attempt to evaporate all of the alkaloids to a dry condition, because of the loss in scaling from glass plates and transferring to the vials, as the compound is so fearfully hygroscopic that it sticks to everything it touches and is converted into a resinous mass almost immediately by absorption of moisture from the atmosphere.

In this connection I would say that when the alkaloids were dissolved in chloroform and the solvent was allowed to evaporate slowly, about two-thirds of the alkaloids crystallized out in bunches of needles in the manner characteristic of atropine; the other one-third remained in a syrupy state very closely resembling the consistence of nicotine. When they were converted into sulphates or hydrochlorides I found it impossible to crystallize them. This I judged to be due to the fact that a considerable portion of the mixture is composed of secondary alkaloids which do not crystallize so readily as does atropine, and that the presence of this non-crystallizable material was sufficient to prevent the atropine salts from crystallizing. This material is practically pure, and the slight trace of color remaining can be readily removed by treating with animal charcoal; though I preferred to send it to you in this state rather than to whiten it, and thus run the risk of converting the secondary alkaloids.

The presentation of Mr. Rusby's report by Mr. Lyons was applauded.

Mr. Kraemer presented in abstract, with blackboard illustrations of his subject, the following paper:

CALCIUM OXALATE CRYSTALS IN THE STUDY OF VEGETABLE DRUGS.

BY HENRY KRAEMER.

The value of the study of reserve starch grains in determining the origin of certain vegetable foods and drugs has been recognized for a number of years. It is, however, becoming more evident that the starch grains which we recognize as typical, and say are characteristic of certain products, occur in a relatively small proportion to the whole number of grains, *i. e.*, the spherical and ellipsoidal starch grains occur in all starchy products, no matter what their origin may be, and the so-called characteristic grains (as the angular grain in corn, or the eccentric grain with characteristic point of growth and lamellæ in maranta, potato, calumba, etc.), are by no means so numerous as is commonly supposed. So that, for instance, an examination of wheat-flour,* which has been admixed with say, from 5 to 10 per cent. of corn meal, reveals in a microscopical mount of a milligramme of the material but two or three typical corn starch grains; and even though the admixture is about 25 per cent. only about seven typical grains will be found.

On the other hand, calcium oxalate occurs in crystals of definite form and size in a large number of drugs, and in only a comparatively few instances is there a distinct variation in the type, as for instance in *Datura stramonium* L.†

R. von Wettstein in a study of the Umbelliferæ has shown that the presence and distribution of calcium oxalate crystals are important factors

* Kraemer, Jour. Am. Chem. Soc., 1899, p. 650.

† Kraemer in Proc. A. A. A. S., 1899, 305.

in systematic work, at least in this family, and my own studies of the Solanaceæ also tend to confirm this view. It may also be noted that soil conditions do not seem to influence the amount of this salt, *i. e.*, a plant growing in silicious soil will contain about the same amount as one growing in calcareous soil. I have, however, referred to the fact that when fungi* are growing on plants there is likely to be a decrease in the number of calcium oxalate crystals usually present.

Calcium oxalate occurs in plants in either the monoclinic or tetragonal system. The crystals of the monoclinic system are rather widely distributed, and consist of $CaC_2O_4 + 3$ to 6 molecules of H_2O; while those of the tetragonal system occur less frequently, and the salt has the formula $Ca\,C_2O_4 +$ 1 to 2 molecules of water. It is rather interesting to note that while both forms of crystals may be obtained in even the same solution artificially, that in nature the one form or the other is constant for the species. Various explanations have been offered, showing under what conditions the two forms of crystals arise. Haushoper states that the tetragonal crystals are formed in a neutral or alkaline solution, whereas the monoclinic crystals require an acid solution for their formation. Kny believes that when there is more calcium in proportion to the oxalic acid, tetragonal crystals are formed, but when the proportions are reversed, then crystals of the monoclinic system arise. The observations of Kohl tend to confirm the studies of Kny.

While calcium oxalate crystallizes in these two systems, it is highly probable that but one of these systems is represented by our vegetable drugs, viz., the monoclinic system, which includes a number of forms as follows:

(1) Rosette aggregates, or what are commonly termed rosette-shaped crystals.

(2) Prisms, pyramids and elongated or irregular hexagonal-shaped crystals.

(3) Crystal-fibers.

(4) Raphides.

(5) Cryptocrystalline crystals.

(6) Membrane crystals.

1. *Rosette Aggregates* consist of numerous small prisms and pyramids or hemihedral crystals more or less regularly arranged on a central crystal and having the appearance of a rosette or star. The development of this form may be readily followed in the stem of *Datura stramonium* L. This form is more largely represented in our drugs than any other form, and the following is a list of the pharmacopœial drugs in which they are contained, together with the size of the crystals:

Althæa, 25 micron.
Anisum, 2–3 micron.

* Kraemer in Proc. A. Ph. A., 1898, p. 297.

Belladonnæ folia, occasionally
Buchu, 15–25 micron.
Calendula, 4 micron.
Cannabis indica, about 20 micron.
Carum, 0.5–1.0 micron.
Caryophyllus, 10–15 micron.
Chimaphila, 40–60 micron.
Conium, 1–2 micron.
Coriandrum, 3–7 micron.
Cusso, about 20 micron.
Eriodictyon, 20–25 micron.
Euonymus, 15–20 micron.
Foeniculum, 1–2 micron.
[1] Frangula, 5–20 micron.
Geranium, 45–70 micron.
Gossypii radicis cortex, about 20 micron.
[1] Granatum, about 15 micron.
Humulus, 10–15 micron.
Jalapa, 30–35 micron
Pilocarpus, 20–30 micron.
Pimenta, 10 micron; occasionally 25 micron.
Prunus Virginiana, 20–30 micron.
Quercus alba, 10–20 micron.
[1] Rhamnus purshiana, 5–20 micron.
Rheum, 50–100 micron.
Rubus, 25–30 micron.
Stillingia, about 35 micron.
Viburnum opulus, occasionally.
Viburnum prunifolium, 15–35 micron.

[1] In these drugs prisms and pyramids in group No. 2 also occur.

2. *Monoclinic Prisms and Pyramids.*—Next to the rosette aggregates the prisms and pyramids occur in the greatest number of pharmacopœial drugs. These frequently are so modified in form that they are of an elongated or irregular hexagonal shape. The crystals of this group are sometimes mistaken for silicon.* Owing to the fact that the lumen of the cell in some instances is completely filled by the crystal and the inner wall having the contour of the crystal, it is impossible by simply using hydrochloric acid to determine whether the crystal has been dissolved or not. This group of crystals is found in the following drugs and in the sizes given :

Calumba, about 15 microns in stone cells.
Cardamomum, 10–25 micron.
Coca, 3-10 micron.
Eucalyptus, 15–25 micron.
Frangula, 5–20 micron.
Gelsemium, 15–30 micron.

* Silicon never occurs as a cell content in sharp angular crystals, but occurs either in more or less elliptical or irregular hollow masses or in more or less solid irregularly branching masses.

Granatum, about 15 micron.
Hamamelis, 7–20 micron.
Hyoscyamus, about 10 micron; single or in twin crystals.
Krameria, about 100 micron.
[2] Pimenta, occasionally.
Prunus Virginiana, 20–30 micron.
[3] Quassia, about 25 micron.
[2] Quercus alba, 10–20 micron.
Quillaja, 35–200 micron.
Rhamnus purshiana, 5–20 micron.
Senna, 10–20 micron.
Uva Ursi, 7–10 micron.
Vanilla, 7–35 micron.
[2] Viburnum opulus, 15–30 micron.
[2] Viburnum prunifolium, occasionally.
Xanthoxylum, 10–25 micron.

[2] Rosette aggregates are also present in these drugs.
[3] Cryptocrystalline crystals also occur.

3. *Crystal Fibers.*—In quite a number of drugs a single monoclinic prism occurs in each of the parenchyma cells, adjoining the sclerenchyma fibers, and to this single longitudinal row of superimposed cells the name crystal fiber has been applied. They occur in the following drugs, the size of the individual crystals also being given :

Calamus, about 15 microns.
Frangula, 5–20 micron.
Glycyrrhiza, 15–20 micron.
Hamamelis, 7–20 micron.
Hæmatoxylon, 10–15 micron.
Prunus Virginiana, 20–30 micron.
Quercus alba, 10–20 micron.
Quillaja, about 35 micron.
Rhamnus purshiana, 5–20 micron.
Santalum rubrum, 7–15 micron.
Ulmus, 10–25 micron.
Uva Ursi, 7–10 micron.

4. *Raphides* was the name given by A. de Candolle (1826) to the groups of needle-shaped crystals found in various plants. These have been mistaken by several observers for calcium phosphate.* Usually the cells containing raphides are long, thin-walled and contain sooner or later a mucilage,† which arises from the cell sap and behaves with reagents much like cherry-gum. The cells are either isolated or occur in groups placed end to end, as in Veratrum viride, forming Hanstein's "Raphiden-führende Schlauchgefässe." Raphides are found in the following drugs and of the length given with each :

* Calcium phosphate is apparently seldom found in plants, except either in solution or in combination with protein substance.

† Kraemer, in Amer. Jour. Pharm., 1898, 285.

[3] Belladonnæ folia, occasionally.
Cinnamomum, about 5 micron.
Convallaria, about 40 micron.
Cypripedium, about 45 micron.
Ipecac, 20–40 micron.
[3] Phytolacca, about 30 micron.
Sarsaparilla, 6–8 micron.
Scilla, 0.1 to 1.0 Mm.
Vanilla, about 400 micron.
Veratrum viride, about 45 micron.

[3] Cryptocrystalline crystals also occur.

5. Cryptocrystalline crystals of calcium oxalate are exceedingly small (about .2 to 10 micron in diameter) deltoid or arrow-shaped, and are so numerous as to entirely fill the parenchyma cells in which they occur, giving the cells a grayish-black appearance and readily distinguishing them from other plant cells. Vesque supposed that they were tetrahedrons and termed them "Sable Tetraédrique." My own investigations tend rather to the opinion that they are in the nature of hemihedral forms of monoclinic crystals. This view is strengthened by the fact that monoclinic prisms occur in neighboring cells in the same plant as in *Datura stramonium* L., Quassia, etc. Cryptocrystalline crystals are found in the following drugs:

Belladonnæ folia.
Belladonnæ radix.
Cinchona.
Phytolaccæ radix.
Quassia.

6. Membrane crystals.—There are several forms of crystals which may be included in this group. The so-called Rosanoff crystals* consist of rosette aggregates attached to inward protruding walls of the plant cell. These, however, do not concern us so much as the large monoclinic crystals which have a membrane (called by Payen "tissu special") surrounding them. The crystal first appears in the cell-sap and then, in the protoplasm around the crystal, numerous oil globules appear; later some of the walls of the cell thicken and grow around the crystal which they finally completely envelop. Crystals of this character and of the sizes given, are found in the following drugs:

Aurantii amari cortex, 15–20 micron.
Aurantii dulcis cortex, 20–30 micron.

CARBOHYDRATE CRYSTALS.

While calcium oxalate crystals have been mistaken for crystalline sugars, it should also be pointed out that some of the more or less soluble carbo-

* Rosanoff, in Bot. Zeit., 1865, p. 329.

hydrates, as hesperidin and inulin, may be mistaken for calcium oxalate. They occur in either sphere-crystals or irregular spherical aggregates which are more or less easily soluble in water. They are found in buchu, hedeoma, inula, lappa, pyrethrum, taraxacum and triticum.

DRUGS WITH LITTLE OR NO CALCIUM OXALATE.

In the following drugs calcium oxalate crystals are either wanting entirely or so few as to be without any diagnostic value: Aconitum, apocynum, arnicæ flores, capsicum, chirata, cimicifuga, colchici cormis, colchici semen, colocynthis, cubeba, digitalis, eupatorium, gentiana, grindelia, hydrastis, lappa, leptandra, linum, lobelia, marrubium, mentha piperita, mentha viridis, mezereum, myristica, nux vomica, pereira, physostigma, piper, podophyllum, rhus glabra, rosa gallica, sabina, sanguinaria, santonica, sassafras, senega, serpentaria, sinapis alba, sinapis nigra, spigelia, staphisagria, strophanthus, sumbul, valerian and zingiber.

CONCLUSION.

The value of the study of the characteristic form, or absence of calcium oxalate crystals, is at once apparent when we consider the ease with which one can distinguish without question the solanaceous leaves, horny belladonna root from inula, the genuine cinnamons, strophanthus seeds and other drugs, from those that are spurious; true spigelia from an adulterant which contains calcium carbonate. Examples requiring verification of this kind are continually coming up, not only in the determination of powdered drugs, but crude drugs.

Mr. Kraemer was applauded.

MR. LLOYD: May I ask the writer of the paper if he can tell us what part these crystals take in the economy of the life-work of the plant?

MR. KRAEMER: Some years ago I studied all the different views advanced, but I belong rather to the class of people who think we have been speculating too much in regard to these things. Of course, each one can state his observations, but I do not think any of us know about these things. I believe when we get all our observations together, we can determine what are the uses of these different things, but personally, I cannot say at this time.

MR. SCHNEIDER: My idea—which, of course, is purely theoretical—is, that the principal function of these crystals is mechanical; that the presence of these crystals increases the elasticity of the bark. The space between the crystal and the cell-wall is occupied by a sort of mucilage, which acts as a bumper between the cell-wall and the crystals, thus increasing the elasticity. Some think it serves to protect the plant against destruction by animal life—for instance, insects; but I do not think that position is tenable, because of the location of the crystals.

MR. LYONS: I would like to ask whether Mr. Kraemer has compared the crystals of belladonna leaves with those of the false belladonna, scopola?

MR. KRAEMER: No, sir; I have let scopola alone.

THE CHAIRMAN: We will now listen to a discussion by Mr. Gustavus D. Hinrichs, on "The Atomic Weight of Arsenic."

Mr. Hinrichs presented the following paper, and discussed the same with explanations on the blackboard.

A FEW REMARKS ON THE ATOMIC WEIGHT OF ARSENIC.

BY G. D. HINRICHS.

The Committee for the Revision of the United States Pharmacopœia has for over a year had the question of Atomic Weights under consideration.

In my work just published, under the title, "The Absolute Atomic Weights of the Chemical Elements, Established upon the Analyses of the Chemists of the Nineteenth Century, and Demonstrating the Unity of Matter," I have presented the results of my investigations extending over almost half a century.

I will now illustrate before this Association results obtained by me, taking as my example the atomic weight of arsenic, a metal of special importance to the pharmacist.

Sodium Pyroarsenate is a fixed, accurately weighable compound of arsenic, and therefore suitable for atomic weight determination. Professor Edgar F. Smith, of Philadelphia, has shown that it is readily and completely converted into common salt (sodium chloride) by gentle heating in a current of dry hydrochloric acid gas.

Ten such determinations were made under Professor Smith's direction, using up to about three grammes of the pyroarsenate. In the last (tenth) determination, 3224.85 mgr. of pyroarsenate yielded 2131.68 mgr. of salt.

Accordingly, the *analytical ratio* is—

$$\frac{\text{Salt}}{\text{Pyroarsenate}} = \frac{2131.68}{3224.85} = 0.66102.$$

But the chemical formula of the pyroarsenate is $Na_4O_7As_2$; its common molecular weight is, therefore, 354.

The chemical formula of salt is NaCl, and its common molecular weight is 58.5.

The common atomic weights are our *fixed standards*, namely, for Carbon-Diamond taken as *exactly* 12; O = 16; Na = 23; Cl = 35.5; and As = 75; *exactly*, without further decimals whatever.

Accordingly, our *atomic ratio* is—

$$\frac{4NaCl}{Na_4O_7As_2} = \frac{234}{354} = 0.66102.$$

Since the analytical ratio *agrees exactly* with this our atomic ratio, to the fifth decimal place, it proves that the atomic weight of As is in fact *exactly* 75.

A simple calculation shows, that if the atomic weight of As were 75.01, the atomic ratio would be 0.00038 lower, or 0.66064.

Since none of the observed analytical ratios are as low as that, it is thereby demonstrated that the true atomic weight of arsenic does not depart even as much as 0.01 from the exact number 75.

The mean of all the ten determinations made shows a departure of 0.002 only from the number 75.

Accordingly, the true or absolute atomic weight of arsenic is 75 *exactly*, and the experimental uncertainty is only 0.002 in the mean.

In the same manner, the experimental determinations for all the chemical elements have been examined in my work above specified.

In this way the fog that has for so many years rested over the atomic weights of the chemical elements has been lifted, and the use of false atomic weights seems to be no longer justifiable.

THE CHAIRMAN: We have a paper here upon the Sesquiterpenes, by Oswald Schreiner and Edward Kremers. It is the fourth of a series.

Mr. Schreiner presented the paper in abstract, with blackboard illustrations and some chemical experiments.

The full text of the paper here follows:

THE CHARACTERIZATION AND CLASSIFICATION OF THE SESQUITERPENES. IV.*

BY OSWALD SCHREINER AND EDWARD KREMERS.

The volatile oils contain a large number of hydrocarbons of the general formula $(C_5H_8)x$. This group of hydrocarbons has been designated by the general term of terpenes,† although this term is usually more specifically applied to the group $C_{10}H_{16}$. According to the value of x in the general formula this larger group of terpenes is divided into

Hemiterpenes, C_5H_8,
Terpenes proper, $C_{10}H_{16}$,
Sesquiterpenes, $C_{15}H_{24}$,
Diterpenes, $C_{20}H_{32}$, and higher
Polyterpenes.

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* Pharm. Archives, 1, p. 209; 2, p. 273; 4, p. 61; Proc. Am. Pharm. Assoc., 1899, p. 158.

† This term was introduced by Kekulé in 1866 (from Ger. Terpentin) and comprised all natural hydrocarbons $C_{10}H_{16}$. Later it was made to comprise all hydrocarbons, natural and artificial $(C_5H_8)x$. From the French térébenthine, the generic word terebene was coined (comp. Löwig: Chemie d. org. Verbindungen, II., pp. 984, 985 and 990). It should not be confounded with the modern modified usage suggested by v. Baeyer in accordance with the Geneva Congress nomenclature. According to his suggestion tetrahydrocymenes, $C_{10}H_{18}$, are "terpenes," whereas dihydrocymenes, $C_{10}H_{16}$ (comprising but one of the numerous possible groups of terpenes, according to the oldest conception of the term) are to be designated terpadienes, because they have two double bonds, hence di-enes.

Of the hemiterpenes but a single representative has been found in a volatile oil, namely isoprene, in the oil obtained by destructive distillation of caoutchouc or gutta percha. The terpenes proper and sesquiterpenes are among the principal constituents of the volatile oils. The diterpenes and higher polyterpenes are more rarely found and but little studied.

Until quite recently these hydrocarbons were identified and classified on the basis of their physical properties alone. Such a system must inevitably lead to endless confusion. The hydrocarbon was usually named according to the plant from the volatile oil of which it had been isolated, or simply named after the volatile oil itself. Thus, for instance, limonene was differently named, and also considered as a different compound according to the source from which it was obtained. The limonene in lemon oil was considered as an isomer of that in orange oil, that in the oil of *Citrus bigaradia* as an isomer of that in the oil of *Citrus lumia*, and isomeric with all these was the limonene in caraway oil, the carvene. Thus we find in literature as many as ten synonyms for limonene, and as many as twenty synonyms for dipentene, the optically inactive modification of limonene. Pinene, as it occurs in the various turpentine oils; camphene; dipentene, obtained from dipentene dihydrochloride, the "camphor de citron;" caoutchouc, etc., were also considered as isomeric with these. This kind of isomerism, based on the source of the isolated hydrocarbons, might be termed genetic isomerism.

This large number of supposedly different hydrocarbons was due to the fact that the latter are very often accompanied in the volatile oils by oxygenated constituents, which are not readily separated from the hydrocarbons by fractional distillation. In many cases, two or more hydrocarbons are simultaneously present in the oil, and the resulting hydrocarbon fraction was often considered a distinct hydrocarbon. Thus it happened that fractions were obtained which differed in odor and other physical properties from the hydrocarbons then known, and were at once given specific names and considered as isomers of the others.

For a long time no distinction was drawn between these two kinds of isomerism, the genetic, as we have called it, and the chemical, not even when the study of the hydrocarbons revealed that the turpentine oils behaved quite differently from the oils of the citrus species toward hydrochloric acid and other chemical agents. Gladstone (1864) was the first to question this genetic isomerism and to express the idea that the hydrocarbons of the different citrus species were not isomeric but identical. Although his conclusions were not always correct, he nevertheless produced some order in this chaotic field, by his classification based on physical properties. It was, however, not until the work of Tilden, and especially of Wallach, supplied characteristic chemical reactions, that the different terpene groups could be identified.

The chemical characterization and classification of the terpenes proper,

based on the work of Wallach and others, has cleared up the needless complexity of names caused by a style of nomenclature based on a supposed genetic isomerism. Thanks to these researches, the terpenes proper are now well characterized, and their identification offers no particular difficulty. Their further investigation lies along a sure and now well beaten path.

In the field of the sesquiterpenes much more remains to be done. The condition for the investigation of these hydrocarbons appeared exceedingly unfavorable, yet the experimental results obtained recently are very encouraging. As a matter of fact the outlook has assumed rather encouraging aspects.

If the names given to hydrocarbons $C_{15}H_{24}$ from different oils are to be regarded as standing for as many sesquiterpenes, there are at present more than fifty of these compounds. The confusion accompanying this genetic style of nomenclature will, no doubt, be removed with increasing knowledge of these substances.

The sesquiterpene of pepper oil has already shown itself to be identical with caryophyllene. Further work will doubtless show many of these genetic isomers to be identical with known sesquiterpenes, and the total number be thus materially decreased. The experimental work is furnishing a means of differentiation and identification of many of the sesquiterpenes, and it is hoped that the others will also lend themselves to a similar experimental treatment.

After a brief historic account of the attempted classification of terpenes in the larger sense, as showing the relation of the sesquiterpenes to the other groups in this class, the position of these so-called sesquiterpenes in the modern rational system of classification of the hydrocarbons will be indicated. This will be followed by an outline of a general system of classification of the sesquiterpenes, and the position of the better known representatives in this system.

The "volatile oils," [hydrocarbons $(C_5H_8)x$] were early divided into three orders of camphenes (Schödler).*

Camphenes of the I. order. These were the natural terpenes. They differed from the following orders in possessing optical activity.

Camphenes of the II. order, designated as "campherenes." These were the isomeric modifications resulting by simple chemical reactions from the hydrocarbons of the I. order. They and their compounds were optically inactive.

Camphenes of the III. order, designated as "camphilenes." These were the isomeric compounds which resulted by more complex reactions from the foregoing. They were also inactive.

It may be of interest to add that Soubeiran & Capitaine† in 1840 made

* See Fr. Gruenling, Dissert., p. 11, Strassburg, 1879.

† Journ. de Pharm. 26, p. 1.

the following statement in regard to the nomenclature used by them "Camphène est pour nous le nom générique qui réunit toutes les espèces C_5H_8. Nous appliquons la terminaison *ène* à toutes celles de ces huiles hydrocarbonées qui forment une combinaison solide avec l'acide hydrochlorique. Nous employons la terminaison *ilène* pour celles qui donnent un camphre liquide."

Gerhardt,* following the system of Gmelin, divided all organic compounds into families according to the number of carbon atoms in the compound. The hydrocarbons of the general formula $(C_5H_8)x$ were classified according to their boiling points and a vapor density as follows:

Camphenes, belonging to the tenth family, $C_{10}H_{16} = 2$ volumes of vapor and boiling at about 160°.

Paracamphenes, belonging to the fifteenth family, $C_{15}H_{24} = 2$ volumes of vapor and boiling at about 260°.

Metacamphenes, belonging to the twentieth family, $C_{20}H_{32} = 2$ volumes of vapor and boiling at about 310°.

Berthelot soon showed these systems of classification to be entirely inadequate. Berthelot, who had specifically studied the optical relations of the terpenes, distinguished between those occurring in nature and those obtained from the latter by a number of reactions. The natural hydrocarbons (formerly camphenes of the I. order) were inverted:

1. By heat into pyrolenes.
2. By the action of acids into terebene (formerly camphene of the II. order).
3. By treatment with the halogens and hydrohalogens into camphenes (formerly camphilenes). The members of this latter group were further differentiated, namely:
   α) the crystallized monochlorhydrate of terpene (?) gives by careful decomposition camphene, which crystallizes, is optically active, and yields with hydrochloric acid the original chlorhydrate;
   β) the liquid monochlorhydrate contains a hydrocarbon camphilene, it is liquid, but is separated unchanged only with difficulty;
   γ) terpilenes are obtained by careful decomposition of the dichlorhydrates, they are, like the dichlorhydrates themselves, optically inactive.
4. Polymers of terpenes(?), terebenes, camphenes, camphilenes and terpilenes are finally designated by the prefixes "meta," "para," and "iso."

The next important classification is that by Gladstone * in 1864. Although based on physical properties alone, this system is in its main lines similar to the later chemical system of classification. He divided the hydrocarbons $(C_5H_8)x$ into compounds $C_{10}H_{15}$, $C_{15}H_{24}$, and $C_{20}H_{32}$. The

* Gerhardt, Grundr. d. org. Chem., 2, pp. 242 and 413.

hydrocarbons $C_{10}H_{16}$ were subdivided into two further groups, as is seen from the following:

I. (a) Sp. gr. = 0.846; boiling point about 173°; formula $C_{10}H_{16}$.
   (b) Sp. gr. = 0.85+; boiling point about 160°; formula $C_{10}H_{16}$.
II. Sp. gr. = 0.90+ to 0.92+; boiling point 250°–260°; formula $C_{15}H_{24}$.
III. Colophene; boiling point about 315°; formula $C_{20}H_{32}$.

To group (a) belong the hydrocarbons of the citrus species, which he considers identical rather than isomeric. Group (b) consists of the hydrocarbons of the turpentine oils, etc.

About this same time the word "terpene" was introduced, evidently by Kekulé. In his Lehrbuch der organischen Chemie (1866), II, p. 437, he says "—das Terpentinöl und die zahlreichen mit ihm isomeren Kohlenwasserstoffe, welche im Allgemeinen als Terpene bezeichnet werden mögen." The use of the word "terpene" in a larger sense is of a later date.

In a second communication made by Gladstone,† in 1871, he makes a more detailed comparison of the physical properties of the respective groups. The table given to show these group differences is of interest in this connection, and is reproduced in the following:

	10-Carbon Group.	15-Carbon Group	Colophene
Formula	$C_{10}H_{16}$	$C_{15}H_{24}$	$C_{20}H_{32}$
Vapor density	4.7	7.1	——
Character of liquid	Limpid	Viscid	Very viscid
Sp. gr. at 20°	0.846—0.880	0.904—0.927	0.939
Refractive index for A, at 20°	1.457—1.467	1.488—1.497	1.5084
Dispersion	About 0.027	About 0.029	0.031
Sensitiveness ‡	About 48	About 43	41
Boiling point	160—176°	249—260°	315°
Action of sulphuric acid	Polymerizes	Doubtful	None
Solubility in aqueous alcohol	Freely soluble	Sparingly soluble	Insoluble
Combination with HCl	$C_{10}H_{16}2HCl$ and $C_{10}H_{16}HCl$	$C_{15}H_{24}2HCl$ and in smaller proportions	Very small quantity

Gladstone remarks on the table as follows: "It will be evident that the middle or fifteen-carbon group is intermediate in all its properties, and that these groups do not pass by insensible gradations into one another, but are separated by strongly marked divisions. There is no difference in specific refractive energy, and the various members of the ten- and fifteen-carbon groups at least have powerful odors, and rotate the plane of polarization strongly, sometimes in one, sometimes in the other direction."

* Journ. Chem. Soc. 17, p. 1.

† Journ. Chem. Soc., 25, p. 1; Pharm. Journ., 31, p. 704.

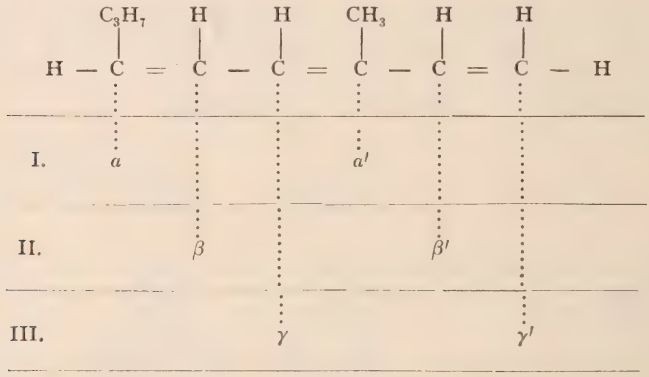
‡ This refers to expansibility by heat.

Based on the different properties of the nitroso compounds, Tilden,* in 1877, divided the terpenes into two groups, as follows:

1. Turpentine group. Boiling point 156—160°; melting point of nitroso derivatives 124°; they form solid crystalline hydrated terpin $C_{10}H_{20}O_2H_2O$.
2. Orange group. Boiling point 174—176°; melting point of nitroso derivatives 71°; form (by Wigger's process) no solid crystalline terpin hydrate.†

Of the individual members of the groups Tilden says: "The liquids included in each group are allotropic modifications of the same hydrocarbon, distinguished one from another by their various rotatory action on the polarized ray."

In 1878 Tilden ‡ set up the following formula to explain the constitution of the terpenes, which is of interest as he proposes a classification of the terpenes in connection with it:



According to the boiling points, specific gravity, and the action of certain agents, especially nitrosyl chloride, he divides the terpenes into the three classes indicated above, in which the propyl and methyl groups are connected with the carbon atoms α and α', second with β and β' and third with γ and γ', respectively.

Armstrong and Wright are, however, of the opinion that this explanation is insufficient, and that the camphenes doubtless form a fourth class.

In 1879§ Tilden again distinguished between the low boiling (turpentine group), and the high boiling terpenes (orange oil group). The

* Pharm. Journ., 37, p. 191.

† This statement is not correct. Both dipentene and limonene produce terpin hydrate. Comp. Flückiger, Arch. d. Pharm., 222, p. 362; also Kremers, Am. Chem, Journ., 17, p. 695.

‡ Ber., 11, p. 152.

§ Jour. Chem. Soc. 49., p. 611.

former combine with one molecule, the latter with two molecules of hydrochloric acid.

In 1886 Gladstone reports on the refraction and dispersion equivalents of the volatile oils. Based on these additional physical constants, he continues his classification of these hydrocarbons. He says: "It is now generally accepted that the isomeric oils of the formula $C_{10}H_{16}$ fall into two groups—the terpenes and the citrenes, or isoterpenes. These two groups, together with the cedrenes, $C_{15}H_{24}$, differ in boiling point, specific gravity, and rotatory power, and also in specific refractive and dispersive energy."* Based on the optical properties, he comes to the following "speculative" conclusion: "That the citrenes differ from the terpenes by containing a second pair of doubly-linked carbon atoms, and that the double-linking of this second pair is also analogous to that of the olefines." †

In this statement, based on purely physical properties, we find the germ of the later physico-chemical classification. Nor is the recognition of this difference in the constitution of the "citrenes" and "terpenes" entirely due to Gladstone. Even the earliest investigators in this field voiced this difference, not indeed in the terms of double bonds, for these are of a later date, but in the terms then in use. Thus we find distinction made between the *double saturation capacity* of limonene and the *single saturation capacity* of pinene. Berthelot is perhaps the only one who, at least for a time, considered this distinction as unimportant. This same saturation idea is emphasized in Tilden's work above cited. The modern classification based on structural differences may, therefore, be said to have had a gradual development, but to Wallach belongs the credit of having clearly pointed out these structural differences as a basis of classification.

It would lead too far to discuss in this connection the effect of the discovery of the nitroso compounds in the field of terpenes. Suffice it to say that the researches of Wallach and others have made definite identification and characterization of the terpenes proper possible. According to Wallach, the terpenes proper may be divided into two groups:

1. Those containing one double bond.
2. Those containing two double bonds.

This classification underwent slight modification with the discovery and study of new terpenes. The insufficiency of this system was, however, especially emphasized by the discovery by Semmler of a chain compound, $C_{10}H_{16}$, which he called an olefinic terpene.

No system of classification which is based solely on the insufficient data of imperfectly known substances will suffice for any length of time. A classification of the group of hydrocarbons $C_{10}H_{16}$ that is to prove more

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* Chem. News, 54, p. 323.

† Ber., 11, p. 1131.

than ephemerally useful must be based broadly on the best classification of hydrocarbons in general. This applies to the sesquiterpenes as well as to the terpenes. The classification of the terpenes was developed historically for a threefold purpose. First of all, to show the imperfections of any system that contents itself with actual facts and ignores all possibilities; secondly, because the historical classification of the sesquiterpenes naturally developed along lines laid down for the terpenes; and thirdly, because the principles underlying a broadly rational classification of the sesquiterpenes are the same as those upon which the classification of the terpenes are based, only the conditions are more complex.

In the earlier classifications the sesquiterpenes were left entirely out of consideration, and indeed beyond the classification of Gladstone into compounds $C_{10}H_{16}$,$C_{15}H_{24}$ and $C_{20}H_{32}$ they were scarcely considered. The terpenes themselves were offering so much difficulty at the time that the study of the higher boiling viscous sesquiterpenes was considered as a hopeless chemical problem, and, as is usually done in such cases, they were entirely omitted from any attempt at classification beyond that necessitated by differences in molecular weight.

In 1892 Wallach * suggested a classification of the sesquiterpenes along a line similar to the one used for the terpenes. He divided them into two groups: those containing two ethylene bonds, and those containing one ethylene bond. At that time there were only two sesquiterpenes which were characterized, and these only partially—Cadinene belonged undoubtedly to the group containing two double bonds, as its molecular refraction and dihydrochloride indicated. Although the molecular refraction of caryophyllene, the other sesquiterpene then known, showed two double bonds, Wallach was of the opinion that perhaps it contained only one, because the monohydrate was a saturated compound. The preparation of the crystalline dihydrochloride, reported on in this paper, and a bromine titration, show conclusively that caryophyllene contains two double bonds, and it would, therefore, fall in the same group with cadinene. As will be pointed out later, a more extensive system of classification will be necessary for the sesquiterpenes.

If the group of sesquiterpenes be considered apart from any connection with the groups of terpenes at large, but simply as a class of hydrocarbons of the formula $C_{15}H_{24}$, it will be readily seen that this group of hydrocarbons must be classified under the formula of saturation C_nH_{2n-6}.

This formula of saturation reveals that, since there are eight unsaturated carbon affinities, there must be four double bonds or their equivalents in the molecule. If the eight hydrogen atoms had been abstracted from a saturated chain compound, $C_{15}H_{32}$, in four pairs from as many pairs of neighboring carbon atoms, a double bond would be introduced between each set of carbon atoms thus treated. In this case the general chain-

* Ann., 271, p 296.

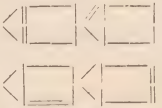
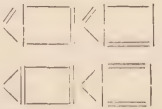
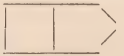
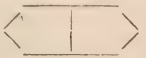
like character of the hydrocarbon would remain unaffected. If, however, two of the hydrogen atoms had been removed from carbon atoms not neighboring, these two free affinities would unite and produce a cycle in-

Monocyclic Group.

Derivatives of cycle of three members.	Derivatives of cycle of four members.	Derivatives of cycle of five members.	Derivatives of cycle of six members.				
Cyclopropane	Cyclotetrane.	Cyclopentane.	Cyclohexane.	Etc.			
Cyclopropene.	Cyclotetrene.	Cyclopentene.	Cyclohexene.	Etc.			
	Cyclotetradiene.	Cyclopentadiene.	Cyclohexadiene.	Etc.			
			Cyclohexatriene or benzene.	Etc.			

stead of a double bond. A cycle, therefore, is the structural equivalent of a double bond. Applying this principle to the formula of saturation, C_nH_{2n-6}, it becomes evident that the following groups of compounds must result :

Dicyclic Group.

Derivatives of dicycle of four members.	Derivatives of dicycle of five members.	Derivatives of dicycle of six members.	Derivatives of dicycle of seven members.	Derivatives of dicycle of eight members.	Derivatives of dicycle of nine members.	Derivatives of dicycle of ten members.
Dicyclotetrane.	Dicyclopentane.	Dicyclohexane.	Dicycloheptane.			
Dicyclotetrene.	 Dicyclopentene.	Dicyclohexene.	Dicycloheptene.			
Dicyclotetradiene	 Dicyclopentadiene.	Dicyclohexadiene	Dicycloheptadiene.			
		Dicyclohexane. Dicyclohexene. Dicyclohexadiene	 Dicycloheptane. Dicycloheptene. Dicycloheptadiene.	'Dicyclooctane. Dicyclooctene. Dicyclooctadiene.		
				 Dicyclooctane. Dicyclooctene. Dicyclooctadiene.	Dicyclononane. Dicyclononene. Dicyclononadiene.	
						Dicyclodecane. Dicyclodecene. Dicyclodecadiene.

I. Chain compounds with four double bonds.
II. Monocyclic compounds with three double bonds.
III. Dicyclic compounds with two bouble bonds.
IV. Tricyclic compounds with one double bond.
V. Tetracyclic compounds with no double bond.

Though it goes almost without saying that in each one of these groups the number of isomeric forms will be great, it may, nevertheless, be advisable here to point out some of the possibilities of the numerous forms of isomerism.

Thus *e. g.* in the first group the basal chain (*i. e.* the genus according to the Geneva Congress nomenclature) first of all comes in for numerous isomeric forms according to the length of this chain and the number and position of the double bonds. Numerous isomeric forms of position are further indicated by the position of the side chain or side chains. Again some of the side chains, from propyl upward, may exist in two or more isomeric forms. Finally one or all of the double bonds may be in the side chains, and their position would again bring about a variety of isomeric forms.

This also applies in the main to other groups, but here the cyclic nature of the compound adds a new factor. Evidently the cycle may consist of three, four, five, six, or even more carbon atoms. Each of these may be further subdivided according to whether none, or one, two or three double bonds are in the cycle. This is best seen from the accompanying chart.

The total number of possible isomers in the group $C_{15}H_{24}$ is by no means shown in this chart. With the introduction of the side chains the position of the double bond or bonds with reference to the chain or chains must be considered and the number of possibilities is greatly increased. If the isomerism of the side chains is also considered, the possibilities become very great, as was mentioned in speaking of the chain compounds.

The chart shows that the monocyclic group allows of a further subdivision into what might be called *nuclear types* as follows:

1. Three carbon atoms in the ring.
2. Four " " " "
3. Five " " " "
4. Six " " " "

It is hardly necessary to go beyond the six-membered ring, as nearly all known compounds fall within this limit. Each of these nuclear types may be further divided according to the number of double bonds in the cycle, as is shown in the chart.

The second chart shows the dicycle group, divided into nuclear types, and the subdivisions of these. In this group the isomerism becomes more complex, and for this reason the types have been indicated rather than filled out. In the chart the two cycles are represented as being connected

by two carbon atoms. It is of course possible that they be connected by only one carbon atom, and indeed, they may even be connected by an intervening chain of carbon atoms. With the tricyclic and tetracyclic groups the isomerism in the nuclear types becomes quite complex, but it must be remembered that as the isomerism in the nucleus increases, the possible number of isomers in the side chains continually decreases, so that the total number of isomers in a group does not necessarily increase with the number of cycles.

The foregoing considerations give us a very extensive system of classification for the sesquiterpenes. Based on the formula of saturation, it includes every possible compound of the formula $C_{15}H_{24}$, from a tetracyclic to a chain compound, and every possible nuclear structure. Although the number of theoretically possible isomers of the sesquiterpenes is exceedingly large, amounting to many thousands, the probable number of these compounds is far less. At present we can only hope to classify the sesquiterpenes into groups of chain, monocyclic, dicyclic, tricyclic and tetracyclic compounds. In order to accomplish even this much, the sesquiterpenes must first be well characterized and identified. It is with this phase of the work that we are at present engaged in the laboratory. This accomplished, the compounds may be more closely studied and their structure determined, thus fitting each member of the group into its proper nuclear type.

The theoretical discussion of the possibilities of the formula $C_{15}H_{24}$ show that the sesquiterpenes offer a large field for chemical research. The very possibility of the existence of isomers in this group of compounds varying from tetracyclic to chain compounds is something which no other class of hydrocarbons offers. Nor is this merely a theoretical possibility. Although the knowledge of this class of hydrocarbons is still in its infancy, the experimental facts already indicate the probable existence of representatives of four out of the five possible groups. The position of some of these sesquiterpenes in this system may now be considered.

The *tetracyclic* group, containing no double bonds, would be difficult to attack experimentally with the present state of our knowledge. It could not form halogen or hydrohalogen addition products, nor yield nitroso derivatives without suffering a break in the cycle. It may yield substitution products and thus be brought into the realm of experimental research. No members of this group are known, although it is possible that some of the heavy sesqiterpenes which appear not to react with nitrosyl-chloride may belong to this group.

The *tricyclic* group may possibly have a representative in the clovene, isolated by Wallach from caryophyllene hydrate by treatment with phosphorus pentoxide. Clovene evidently contains only one double bond, as is shown by its molecular refraction and general chemical behavior.

The *dicyclic* group has a number of representatives and, judging from the molecular refractions of many of the uncharacterized sesquiterpenes, this

promises to be by far the largest group. Cadinene undoubtedly belongs to this group, as is shown by its molecular refraction, formation of a dihydrochloride and general chemical behavior. Caryophyllene also belongs to this group, as is definitely shown by recent chemical and optical work.

Humulene in all probability belongs to this group. Its molecular refraction indicates two double bonds, although a crystalline dihydrohalogen derivative has not yet been prepared.

The *monocyclic* group probably has a representative in zingiberene. Its optical behavior undoubtedly speaks for three double bonds, but its chemical derivatives so far prepared are not concordant. This was exactly the condition with caryophyllene, but later chemical work confirmed the optical method. We are inclined to consider the indication of the optical method as the more trustworthy in this case, for the following reasons:

1. The optical method has proven trustworthy in the case of caryophyllene, and with a large number of compounds in other fields of research. The argument that the zingiberene subjected to the optical test was not absolutely pure, being obtained by fractional distillatiou, while true, has no bearing on this question, as can be readily shown. A glance at the table on page 343, showing the properties of the fractions obtained in the neighborhood of the zingiberene fraction, shows at once that those immediately preceding and following the two zingiberene fractions are higher in specific gravity than the sesquiterpene fractions. Any admixture with these would, therefore, increase the specific gravity of the sesquiterpene. It is, however, the very low specific gravity of this compound which causes the result to come out for three double bonds. This specific gravity is a far more sensitive factor in the formula $\frac{n^2-1}{n^2+2}\cdot\frac{m}{d}$ than is the index of refraction.

2. The sesquiterpene has a much lower specific gravity than the members of the dicyclic series. This is, however, a change concomitant with the introduction of double bonds.

3. It is almost always far more difficult to form a tri-derivative than a mono- or di-derivative. The dihydrochloride would, of course, form first, and being a crystalline compound, would separate out. The trihydrochloride would form with much greater difficulty, if indeed it can be formed at all. In the bromine titration hydrobromic acid is given off, so this method of testing for the number of double bonds becomes untrustworthy.

Further work is necessary before this question can be definitely decided.

The sesquiterpene found in the oil of the carline thistle by Semmler,* if not identical with zingiberene, belongs at least in the same class with it.

The *chain* group. A possible representative of this group is found in the sesquiterpene isolated by the chemists of Schimmel & Co.† from cit-

* Chem. Ztg., 13, p. 1158.

† Schimmel & Co., Berichte, Oct. 1899, p. 19.

ronella oil. The sesquiterpene has a specific gravity which is even lower than that of zingiberene, and when it is considered that it has separated from methyl eugenol, having a specific gravity of 1.047, this low specific gravity is significant. Its molecular refraction shows *four* double bonds, and its general chemical behavior is in harmony with the view that it is a chain compound.

This brief presentation of the possible members of the various groups, while still rather indefinite, nevertheless, shows that we have among the sesquiterpenes compounds possessing widely different properties, which are doubtless due to some such constitutional difference as that suggested above for their classification.

EXPERIMENTAL.

The Sesquiterpene of Ginger Oil; Zingiberene.

The first investigation of ginger oil was made by Papousek * in 1853, who did not, however, recognize the sesquiterpene. Thresh † in 1881 found the major portion of the oil to consist of a sesquiterpene boiling between 256–260°. This fraction had a specific gravity of 0.899 and a rotatory power of —16.10°. Nitroso derivatives of the sesquiterpenes were unknown at that time, so that Thresh was limited in his investigation to the attempt to prepare a hydrochloride, which failed.

Bertram and Walbaum ‡ in 1894 showed the presence of d-camphene in the fraction boiling between 155–165°. From the fraction boiling about 170° they obtained a compound melting at 102°, by the usual method of testing for phellandrene. This they considered as phellandrene nitrite. The sesquiterpene was not investigated.

H. v. Soden and W. Rojahn § have recently made public the results of an examination of the sesquiterpene of ginger oil. It had a specific gravity of 0.872 at 15°, and a rotation of —69°. By titration with bromine in glacial acetic acid solution, they determined the presence of two ethylene bonds. The tetrabromide formed could not be obtained in a crystalline condition. The hydrochloric acid and hydrobromic acid addition products are reported as brown, viscous oils. Attempts to prepare a nitrosochloride and a nitrosate failed.

The physical properties, specific gravity and rotatory power of this sesquiterpene did not agree with any of the known sesquiterpenes, and v. Soden and Rojahn, therefore, propose the name zingiberene.

At the time of publication of the above results we were engaged in the determination of the physical contents of a sample of the sesquiterpene

* Journ. Pharm. Chim. (3), 23, p. 465.

† Pharm. Journ. (3), 12, p. 243.

‡ Journ. f. prakt. Chemie. II, 49, p. 18.

§ Pharm. Ztg., 45, p. 414.

obtained by distillation. The constants agreed in the main with those of v. Soden and Rojahn. Lack of material, as well as press of other work, caused us to abandon the subject for a while. With new material and more time the work was again taken up.

The oil used had been obtained from Fritzsche Bros., New York. It had a specific gravity of 0.8783, and a rotation of 39.1° in a 100 mm. tube. The oil was subjected to distillation under a pressure of 30 mm. These fractions were collected; their boiling points, together with their specific gravities and angles of rotation in 100 mm. tube, are given in the following table:

Fraction.	B. p. (32 mm.)	Sp. gr. (20°)	αD_{100}
Orig. oil.		0.8783	—39.1°
I.	—150°	0.8759	+ 9.5°
II.	150—162°	0.8768	—60.2°
III.	162—180°	0.8929	—45.5°

FRACTION I. This fraction was refractionated under a pressure of 32 mm. with the following result:

Fraction.	B. p. (32 mm.).	Sp. gr. (20°).	αD_{100}.
I.	—150°	0.8759	+ 9.5°
1	—80°	0.8675	+ 53.8°
2	80—100°	0.8752	+ 37.8°
3	100—160°	0.8828	— 34.1°

A separation into strongly dextrogyrate, low boiling fractions and a laevogyrate higher boiling fraction has been accomplished. Fraction 1, Bertram and Walbaum * have shown to contain d-camphene.

From a somewhat higher boiling fraction the same chemists obtained a nitrosite melting at 102° which they consider as phellandrene nitrite. On treating the lower boiling fractions of ginger oil in petroleum ether solution with a solution of sodium nitrite and glacial acetic acid, it was noticed that the lowest boiling one gave scarcely a trace of nitrosite, the next higher gave a more pronounced reaction, and the third fraction gave so voluminous a precipitate that the entire solution solidified. The latter product was not phellandrene nitrite, although it resembled it very closely, but corresponded in its properties to the zingiberene nitrosite described further on. There was, therefore, a possibility of the reaction noticed in the second fraction also being due to a small amount of the sesquiterpene distilling along with the lower boiling camphene. Cases of this kind, where a higher boiling constituent is found in lower boiling fractions, are not of rare occurrence. All of the second fraction, which was small in amount,

* Journ. f. prakt. Chem., II, 49, p. 18.

was, therefore, treated with sodium nitrite and glacial acetic acid in petroleum ether solution. A small amount of a nitrosite was obtained. On recrystallizing it from methyl alcohol it did not behave as did the zingiberene nitrosite under these conditions. The latter crystallizes in well-developed needles throughout the solution, whereas the derivative obtained from the second fraction separated from the solvent in concrete radiating masses. These showed a melting-point of 102–103°. By recrystallization the melting-point could be raised to 105°. The derivative is, therefore, not zingiberene nitrosite, which has a different crystalline appearance and melts at 97°. The compound agrees in its melting-point with that given for phellandrene nitrite by Wallach, but it does not agree with the crystalline characteristics of this compound. Moreover, the writer has shown that if the phellandrene nitrite is purified by recrystallizing it from hot methyl alcohol or hot ethyl acetate, its melting-point is raised to 120°, and that the crude phellandrene nitrite is probably a mixture of the higher melting nitrite and a second lower melting compound.* Whether this second compound is identical with the derivative obtained from the lower boiling fraction of ginger oil, can unfortunately not be decided at present, as the small supply of the latter compound has been exhausted. It is, therefore, very doubtful whether this compound is phellandrene nitrite. It certainly is not identical nor even similar to the phellandrene nitrite usually obtained.

Fraction II. This was by far the largest fraction obtained from the oil. It was divided into two portions and one of these was heated with 2.5 per cent. alcoholic caustic potash for one-half hour on a water-bath. The oil was then thrown out of solution by water, washed with more water and subjected to steam distillation. The separated distillate was dried with solid caustic potash and fractionated under diminished pressure. The following fractions were collected under a pressure of 32 mm.:

Fraction.	B. p. (32 mm.).	Sp. gr.	αD_{100}.	$n D$.
II.	150—162°	0.8768	—60.2°	——
1	—158°	0.8757	—57.8°	——
2	158—160°	0.8756	—64.1°	——
3	160—161°	0.8731	—64.1°	1.49399
4	161—162°	0.8733	—64.1°	1.49456
5	162—166°	0.8786	—62.4°	——

The largest portion distilled between 160–162° and, as their physical constants show, fractions 3 and 4 are practically identical. The change in the specific gravity of these fractions is worthy of note, that of fractions 3 and 4 being less than that of fractions 1, 2 and 5.

The second portion of fraction II was distilled directly under diminished

* For a more detailed discussion see Pharm. Archives, 4, p. 90.

pressure, without previous treatment with alcoholic caustic potash and steam distillation. The result is given in the table:

Fraction.	B. P. (32 mm.)	Sp. gr.	αD_{100}	^{n}D
II.	150—162°	0.8768	—60.2°	——
1	—158°	0.8782	—53.0°	——
2	158—160°	0.8759	—63.4°	——
3	160—161°	0.8741	—64.1°	1.49409
4	161—162°	0.8740	—64.1°	1.49428
5	162—167°	0.8807	—61.1°	——

In the main the result is the same as with the saponified oil. The quantities of the fractions were approximately the same in both cases. Perhaps the oil treated with caustic potash gives the best results, as the somewhat higher rotatory power of the first two, and the last fractions seem to indicate. The rotatory power of fractions 3 and 4 agrees in both cases, although the specific gravity is slightly higher in the untreated oil. The refractive indices agree with those determined for the fractions from the saponified oil.

The fractions boiling between 160 and 162° were therefore taken as representing the sesquiterpene of the oil, and were used in the subsequent work.

Fraction III. A refractionation gave the following results:

Fraction.	B. p. (32 mm.)	Sp. gr.	αD_{100}
III.	162—180°	0.8929	—45.5°
1	—160°	0.8794	—56.2°
2	160—170°	0.8914	—46.4°
3	170—180°	Very small quantity.	

The fractions boiling between 160—162° were taken as the sesquiterpene of the oil, and subjected to examination. The name zingiberene proposed by v. Soden and Rojahn seems appropriate, and will be used in future for this hydrocarbon.

Physical Constants of Zingiberene.

For the determination of the physical constants of zingiberene fraction 160—161° (32 mm.) of the saponified oil was used. This fraction, as already stated, showed a specific gravity of 0.8731 at 20°. The refractive index of zingiberene was determined with a Pulfrich New Refractometer,* the temperature being kept constant at 20°. The index of refraction found for sodium light and for the three hydrogen lines was as follows:

Na	1.49399
$H\alpha$	1.49041
$H\beta$	1.50319
$H\gamma$	1.51112

* Ztsch. f. phys. Chem., 18 p., 294.

The molecular refraction calculated according to the formula $\frac{n^2-1}{n^2+2}\frac{m}{d}$ for sodium light is 67.87. The calculated molecular refraction, assuming *three* double bonds, is 67.86.

The optical activity of zingiberene was determined with Landolt-Lippich's triple shadow instruments, the temperature being kept constantly at 20° by passing water through a jacket around the tube. The reading in a 100 mm. tube was —64.07°. This gives a specific rotatory power of —73.38° for sodium light at 20°.

A table showing the physical constants as here found and those obtained by v. Soden and Rojahn is given.

	v. Soden and Rojahn.	
Boiling point	134° (14 mm.)	160—161° (32 mm.)
$[a]_D$	—69° *	—73.38°
n_{D_I}	——	1.49399
Sp. gr,	0.872 (15°)	0.8731 (20°)

* Whether this figure is $[a]_D$ or the rotation in a 100 mm. tube is not clear.

ZINGIBERENE DERIVATIVES.

Zingiberene Dihydrochloride.

Thresh * in 1881 attempted to prepare the hydrochloride by passing the dry gas into an ethereal solution of the sesquiterpene fraction, but no crystalline compound could be obtained. Thresh attempted to remove the excess of hydrochloric acid by heating in a current of dry hydrogen until the escaping gas no longer reddened moistened blue litmus paper. The result was unsatisfactory, as analysis showed only 5.47 p. c. HCl, corresponding to the formula $(C_{15}H_{24})_3HCl$. The sp. gr. of the liquid thus obtained was 0.9246.

Von Soden and Rojahn † report the hydrochloric acid addition product as a brown viscous oil.

The analysis of Thresh being so exceedingly unsatisfactory in its results, an attempt was made to prepare the liquid in a purer condition than that reached by Thresh. For this purpose zingiberene was dissolved in an equal volume of glacial acetic acid and saturated with dry hydrochloric acid gas in the cold. The dark solution was treated with water, and as it showed nearly the same density as water, the mixture was treated with ether. The ethereal solution was washed repeatedly with water until the washings no longer gave a turbidity with silver nitrate. After drying with calcium chloride, the ether was evaporated under a pressure of 30 mm. at the temperature of the room. The resulting dark brown oil had a sp. gr. of 1.0691, and an analysis by Carius' method gave the following results for chlorine :

* Pharm. Journ., [3], 12, p. 245. † Pharm. Ztg., 45, p. 414.

Calc. for $C_{15}H_{24}.2HCl$.	Found, I.	II.
25.60 per cent.	27.45 per cent.	27.12 per cent.

The result is strikingly different from that of Thresh, both in specific gravity and chlorine content.

After standing a few days the oil deposited mircoscopic crystals at the edges. This led to attempts to prepare the hydrochloride in a crystalline condition. The following procedure gives good results:

Zingiberene is dissolved in an equal volume of glacial acetic acid and the solution is saturated with dry hydrochloric acid gas at 0°. The solution is then allowed to stand for a day or two, after which time the dark colored liquid will be found to be interspersed with fine needles. These are collected on a force filter and washed with cold alcohol. A second crop can usually be obtained by again saturating the mother liquor with dry hydrochloric acid gas. When recrystallized from hot alcohol, the hydrochloride is pure white and melts at 168–169°. A chlorine determination by Carius' method gave the following results:

.1460 gr. of the hydrochloride yielded .1514 gr. of AgCl.

Calc. $C_{15}H_{24}.2HCl$.	Found.
25.60 per cent.	25.64 per cent.

Zingiberene Nitrosite.

This derivative is more readily obtained than the other nitroso-compounds of this sesquiterpene. It can also be obtained in a pure state with comparative ease if the recrystallization is done on a small quantity and with but a momentary application of heat. When so purified its melting point is sharp and the compound is therefore well suited for identifying the sesquiterpene. It is prepared as follows:

A small portion of zingiberene is dissolved in about 10 times its volume of petroleum ether and is then cooled in ice water or a freezing mixture. It is then treated with a volume equal to the zingiberene used of a saturated solution of sodium nitrite, and the same amount of glacial acetic acid. The liquid shows a passing blue color and on shaking solidifies completely to a mass of white crystals. The magma is best transferred to a cloth and washed with cold water by pressing. After spreading on a porous plate for a short time the compound must be purified at once, as it readily decomposes when in an impure condition. This is best done by recrystallizing from hot methyl alcohol, working with small portions at a time and avoiding heating for any length of time. If heated for only a few minutes no crystals will be obtained. Even a momentary heating will result in considerable loss, but the crystals which do separate are fine silky needles, and after washing are quite pure. If thought necessary the operation may be repeated. Thus purified the compound melts at 97–98°.

A nitrogen determination gave the following results:

I. 0.1327 gr. of nitrosite gave 12.3 Cc. of nitrogen at 24° under a pressure of 736 mm.

II. 0.1896 gr. of nitrosite gave 17.2 Cc. of nitrogen at 22.5° under a pressure of 735 mm.

Calc. $C_{15}H_{24}N_2O_3$.	Found, I.	II.
10.03 per cent.	10.12 per cent.	9.96 per cent.

The compound is much less stable than the corresponding caryophyllene compound. After keeping for a few weeks, it becomes yellow and soon changes to a black, sticky mass.

Zingiberene Nitrosate.

This derivative does not separate when the hydrocarbon is treated in the usual manner, but with a slight modification it separates in large quantities, the yield being almost theoretical. The procedure is as follows:

A small portion of zingiberene is dissolved in an equal volume of glacial acetic acid and of ethyl nitrite. This mixture is well cooled in a freezing mixture and then treated slowly with a mixture of nitric acid and glacial acetic acid, each equal in volume to the zingiberene used.

The first few drops cause a deep bluish-green color which rapidly fades. The mixture remains clear but becomes quite thick, and toward the end of the reaction turbid and exceedingly viscous. At this stage the mixture is treated with about four times its volume of cold alcohol, and on shaking large quantities of the nitrosate separate. This is collected on a force filter, washed with alcohol and dried on a porous plate. Attempts to purify the product by crystallization have so far been unsuccessful. The compound may be purified by dissolving in ethyl acetate and precipitating with alcohol. It is a slightly yellowish powder melting at 86–88° with decomposition.

Zingiberene Nitrosochloride.

The preparation of this derivative offers some difficulty, but the following modification gave gratifying results:

A small portion of zingiberene is dissolved in an equal volume of glacial acetic acid and of ethyl nitrite. After cooling in a freezing mixture, it is gradually treated with twice the volume of zingiberene used, of a saturated solution of hydrochloric acid gas in glacial acetic acid. After a minute or two the reacting mixture is treated with twice its volume of alcohol, continually agitating. The nitrosochloride separates out as a flocculent precipitate. This is collected on a force filter and well washed with cold alcohol. It is a fine white powder, and may be purified by dissolving in ethyl acetate and precipitating with alcohol. Thus obtained, it melts at 96—97° with decomposition.

CARYOPHYLLENE DERIVATIVES.

Caryophyllene Dihydrochloride.

The preparation of this compound was given in an earlier report,* but the question whether it was a mono- or a di-derivative was left unsettled, as no analysis had been made. A chlorine determination made by Carius' method gave the result:

0.1675 gr. of the hydrochloride yielded 0.1668 gr. of AgCl.

Calc. $C_{15}H_{24}2$ HCl.	Found.
25.60 p. c.	24.63 p. c.

Although slightly low, the result can leave no doubt but that it is a di-derivative. This result is in keeping with the two double bonds found by the determination of the molecular refraction of caryophyllene. A bromine titration also indicates two double bonds.

Regeneration of a Sesquiterpene from Caryophyllene Dihydrochloride.

In an earlier report it was stated that the hydrochloride when treated with glacial acetic acid and anhydrous sodium acetate regenerated a sesquiterpene which was probably identical with caryophyllene, as it gave a blue color with sodium nitrite and glacial acetic acid. The regenerated oil gives indeed a blue color under these conditions, but no caryophyllene derivative has so far been obtained from it. Its physical properties are also different from those of caryophyllene, its optical rotation being remarkably so. Nor does it appear to be identical with clovene, regenerated by Wallach from caryophyllene hydrate. A comparison of these three hydrocarbons is given:

	Caryophyllene.	Regenerated oil from caryophyllene dihydrochloride.	Clovene.
Sp. gr.....	0.9039 (20°)	0.9191 (20°)	0.930 (18°)
Index of refraction ...	1.49976	1.49901	1.50066
Rotation	—8.96°	—35.39	

Whether the regenerated oil is an individual compound cannot be stated at present. The indications are that an inversion of the sesquiterpene has taken place.

The Sesquiterpene of Black Pepper Oil; Caryophyllene.

The first analyses of pepper oil, made by Dumas † in 1835, showed it to

* Pharm. Archives, 2, p. 295.

† Liebig's Annalen, 1, p. 159; comp. also Soubeiran and Capitaine, Liebig's Annalen, 34, p. 326.

be almost free from oxygen and the results agreed with the formula $C_{10}H_{16}$. Ebenhardt,* in 1887, verified these results. He separated a fraction boiling between 190–250° and a higher one between 250–310°. Both gave results agreeing with the formula $C_{15}H_{24}$. The fraction 190–250° had the specific gravity 0.9042 and a specific rotation of —7.0°. No chemical work was done on this fraction. It was, therefore, thought to be of interest to study this sesquiterpene by applying the nitroso reactions, as was done with caryophyllene, cadinene and humulene.

The pepper oil used in the following experiments was prepared by distillation under diminished pressure from the oleoresin. Mr. W. S. Ferris very kindly prepared a quantity of the oleoresin from pure black pepper, ground especially for this purpose. The oleoresin, after separation of the piperine, was subjected to direct distillation under diminished pressure. For the distillation and fractionation of the oil, we are indebted to the kindness of Prof. Paul C. Freer. The behavior of the oleoresin on distillation was as follows:

The oleoresin was freed from ether and water by means of a rapid current of dry air at 100°. It was then distilled at 16 mm. pressure and two fractions collected up to 150°.

(1) —130°.
(2) 130—150° (major portion).

At this temperature decomposition set in and it was transferred to the mercury pump at 0.5 mm. pressure. An attempt was made to secure further fractions at this pressure, but owing to gaseous products of decomposition, the pressure could not be maintained. Consequently it was useless to attempt to fractionate the remainder.

The distillate was twice fractionated under 16 mm. pressure without decomposition. There was a small amount of low boiling oil, beginning at 70–75°. The major portion boils from 125–135° at 16 mm. with practically no higher boiling fraction.

The fractions received from Prof. Freer were as follows:

(1) 70—100°
(2) 100—120°
(3) 120—125°
(4) 125—130°
(5) 130—135°

Fraction 125–130° was by far the largest, the others being small in comparison. This was taken as the sesquiterpene fraction and its properties determined. It had a slight peppery odor.

This fraction had a specific gravity of 0.9058, a specific rotation of —7.54°, and an index of refraction of 1.49787, all at 20°. Comparing the

* Archiv. d. Pharm., 225, p. 515.

physical constants with those of known sesquiterpenes, it is seen that with those of pure caryophyllene an agreement as close as might be expected between a crude fraction and a purified product is found.

	Caryophyllene.	Sesquiterpene from Pepper Oil.
Boiling point	136—137° (20 mm.).	125—130° (16 mm.).
Specific gravity	0.9030	0.9058
Specific rotation	—8.96	—7.54
Index of refraction	1.49976	1.49787

That caryophyllene was really under consideration was readily shown by applying the nitrosite test recommended in a former communication.* This test is very readily made with a very small amount of material, 2 Cc. of the fraction sufficing for the identification of the sesquiterpene. The yield of nitrosite was 100 Mg. The test is made as follows:

To a solution of 2 Cc. of the sesquiterpene fraction in 2 Cc. of petroleum ether 2 Cc. of glacial acetic acid, and then 2 Cc. of saturated solution of sodium nitrite are added. The mixture while still warm from the reaction is rotated and then cooled in ice water with violent shaking. Crystallization usually takes place or may be induced with a fragment of nitrosite. The blue crystals are washed with water and then with alcohol.

When recrystallized from hot alcohol, the nitrosite obtained from the sesquiterpene of pepper oil shows the same melting point as that from pure caryophyllene, namely 113°.

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E. M. Houghton explained the salient points of the following paper, his remarks being applauded:

THE PHARMACOLOGIC ASSAY OF PREPARATIONS OF THE SUPRARENAL GLANDS.

BY E. M. HOUGHTON.

Since Addison, in 1855, called attention to the relation of pathological lesions of the suprarenal glands to the disease which has since borne his name, these bodies have been the subject of numerous researches by workers in all lines of medical science. The histologist, the chemist, the physiologist and pharmacologist have each contributed their share to the sum total of the results obtained, which often enough have been widely divergent. But it is not my purpose to review the history of this interest-

* Pharm. Archives, 2, p. 282. Proc. Amer. Pharm. Assoc., 1899, p. 167.

ing subject. It may be remarked, however, that for the first forty years it was the plaything of science, then leaped into prominence when Bates discovered that it could be employed as an astringent in opthalmology, since which time physicians are finding new uses for it almost daily. In the course of some experimental work on the pharmacology of the adrenals, it appeared possible to take advantage of the marvelous influence of the active principle contained in extracts of these bodies upon the blood pressure which had been observed by Oliver and Shafer as a means of measuring their activity. Furthermore, it seemed quite advisable, as we had no chemical means of standardizing them, that some method of assay should be found, since in all probability, in keeping with products of similar nature, there must be variation in the pharmacologic activity owing to the liability to undergo chemical or bacteriological decomposition before, during, or after manufacture in the various products that were to be obtained on the market.

Believing that the results of my observations may be of some interest to the Association, I will briefly outline the method that has given me the best results; this method is based upon the changes produced in the blood pressure of the carotid artery, when variable quantities of a given preparation of the suprarenal glands, dissolved in slightly acidulated water—the inert substance being removed as far as possible—are injected into the femoral or jugular vein of an anaesthetized dog or other animal.

Apparatus. Operating table suitable for experimenting on dogs, and such surgical instruments as are usually found in physiological and pharmacological laboratories, including small glass canulae, suitable for inserting into blood vessels and veins, and a syringe of 10 Cc. capacity. A large sized kymograph with manometer arranged for taking blood pressure tracings, on continuous rolls of white paper with ink pens, or the more convenient smoked paper sheets upon which the results are traced with a stylus, is required. In either case, whether smoked or unsmoked paper is employed, for convenience in making measurements of the height of the blood pressure tracings, the paper should have linear rulings five millimeters apart.

Method.—A small or medium-sized dog is carefully anæsthetized with chloroform, ether or chloretone. I have used the latter drug almost entirely, as but one dose, which is given per stomach, is required. In from fifteen to thirty minutes the animal is thoroughly anæsthetized, and will remain entirely insensible to pain for any length of time.

Another decided advantage possessed by this anæsthetic over chloroform and ether for laboratory work is the fact that the blood pressure remains constant for many hours. After the animal is completely anæsthetized, he is placed on the operating table and glass canulæ of suitable size are tied as quickly as possible into the carotid artery and femoral vein, the vessels being clamped off previously with forceps. The canula in

the artery is connected to an inelastic tube, completely filled with a half saturated sodium carbonate solution to prevent the blood from clotting by means of a short piece of rubber tubing, great care being exercised to exclude all air. The other end of the inelastic tube terminates in a U-shaped glass manometer tube, which is partly filled with mercury, which has resting upon its free surface a glass float tipped with a glass writing pen or stylus. As soon as all the connections are made between the artery and manometer, the clamp employed to prevent the flowing of blood from the vessel is removed, and immediately the float bearing the writing instrument begins to rise and fall in unison with the beats of the heart. The recording drum which has been carefully placed in apposition with the writing instrument is released at the same moment, and a graphic record is made on the traveling sheet of paper of the blood pressure and heart beats. A few inches of record are taken as a normal tracing. Then a quantity of the solution of the preparation of the suprarenal glands, representing a known quantity of the product, is injected into the vein through the other glass canula, care being again exercised to prevent the entrance of air into the vessel. Within a few moments after the injection the blood pressure is enormously increased, but quickly falls again to the normal. As soon as the blood pressure has become normal, a second injection is made in precisely the same manner of a known quantity of the standard solution of the suprarenal gland. Again increased blood pressure results. A comparison of first and second tracings will show whether more or less of the solution being assayed should be injected to produce the same rise in blood pressure as is produced by a given amount of the standard preparation. Ultimately by repeating the injections the requisite amount of the preparation being assayed will be found, which will produce a rise in blood pressure equal to that produced by a given quantity of the standard. The extent of the rise in blood pressure varies in proportion to the amount of the active constituent of the suprarenal gland injected. Several dogs are usually required for making an assay. Two kinds of tracings may be made — complete where the drum of the kymograph is allowed to run continuously, and abbreviated where the drum remains stationary while the reaction takes place. In the latter the rise in blood pressure is recorded as a short perpendicular line. These abbreviated tracings answer admirably for most work, as only variations in blood pressure are taken into account. Where smoked paper is employed, the tracings are fixed by dipping them into shellac, and allowing them to dry. A great many precautions must be observed in carrying out the experiments, such as the amount of material injected at one time, since the extent of the increase in blood pressure must be sub-maximal, volume of fluid injected at one time, the length of time required in making the injections, etc.; but as my time is limited, I will not discuss them further than to say that in keeping with all other methods of pharmacologic assay the

conditions obtaining in the experiments must be kept constant, and the reaction of the preparation being assayed must be compared with a known standard.

Naturally the question will arise as to what should be the standard. At first I employed as a standard a freshly prepared fluid extract of fresh bovine suprarenal glands as a standard, but after the isolation of the active constant, adrenalin, I adopted it as a standard, since its activity remains constant, while other preparations of the suprarenal glands are prone to undergo decomposition and consequent alteration in strength. The animals, after the experiments are concluded, are immediately killed. Since the dogs are procured from the pound and killed by an anæsthetic instead of drowned, there should be no trouble with the humane societies.

The accuracy of results obtained by the application of this method depend, as is true of quantitative methods generally, upon the skill and attention of the operator to details. As a specific example of the results that may be obtained, the following illustrations will suffice: Three samples of adrenalin were prepared of known but concealed strength and assayed. Calling the standard 100 per cent.. the unknowns possessed 40 per cent., 85 per cent. and 130 per cent. respectively; they were reported as being 40 per cent., 88 per cent. and 135 per cent.

The chair stated that it was designed that Mr. Stedem should present a paper by Mr. Gordon, of the Navy, but he was not present, and the paper would be referred for publication, without objection, as it apparently contained a lot of valuable data that it would be well to have in print.

THE INFLUENCE OF SYNTHETIC REMEDIES ON VARIOUS URINE TESTS, AND FALLACIES THEY OFTEN CAUSE. INCLUDING ALSO A FEW DRUGS.

BY FREDERICK T. GORDON, PHARMACIST U. S. N.

The employment in medical practice during recent years of a large and ever increasing number of organic chemical compounds—the so-called "synthetic remedies"—has introduced a new and important factor into the analysis and testing of urine, a factor that has received too little attention considering its far-reaching effects. Scattered through books of reference, reports of associations and the pages of the drug journals, are isolated facts bearing on this subject, yet one may look in vain for information on the effect of some particular remedy unless he happens to chance upon it in general reading, for the various works on urinalysis seem to have overlooked this topic. One indeed, a German work by Dr. Spaethe, has devoted some space to this action of synthetics, but even this is far from being comprehensive. Yet the effect of drugs, including vegetable, mineral and synthetic, on the urine of those to whom they have been administered is a very important matter to the physician, pharmacist and patient, because of the errors they may cause. The need of such data

in a shape convenient for reference and use is the excuse for this paper, which, with its errors of omission and commission, is respectfully offered to this, the representative body of pharmacists of this country, with the hope that it will fill a want long felt by those of us who devote ourselves to urinalysis.

While this paper is especially devoted to the action and effects of the "synthetic remedies," it will also take up such commonly used drugs of our Materia Medica as warrant attention because of their peculiar action on urine, treating them in their proper connection. Where the word "drug" is unmodified, it includes the synthetics as well. The majority of the synthetic remedies are of complex nature and are derivatives of a comparatively small number of primary radicles or bases. They are split up in the body into various primary groups and decomposition products, or are combined with organic secretions, and these derivatives and combinations are eliminated chiefly by the urine either alone or as combinations with organic acids and bases found in the body in health or disease. Quite a number are eliminated unchanged or simply combined with normal constituents of the urine; others pass out in greatly different form. Now these synthetics, besides possessing medicinal effects, have also marked and distinctive chemical properties, a fact that seems to be generally overlooked, and almost all of the large number now in use retain active chemical individuality or effect in the secretions by which they are excreted, either modifying these or giving them peculiar chemical activity, according to their nature. When taken in sufficient quantity and for sufficient time to be absorbed and excreted, the greater number of the synthetics appear in the urine and give it their own particular chemical reactions; many vegetable and mineral drugs also have a marked effect of similar nature. These facts are of great importance, and should be constantly borne in mind when testing urine, as many of these remedies give reactions closely simulating those of albumin, sugar, indican, acetone, blood, etc., when in the urine. The widespread use by the laity of "headache powders" has introduced a liability of error in interpreting the results of a urinalysis that may be of great moment for life insurance, etc., for all of these contain substances eliminated as compounds of marked activity Copper solutions may be reduced and "sugar" reported when this reaction will have been solely caused by some drug administered; albumin, too, may be closely simulated in a hasty examination, and many other pathological indications will seem to be present. That this assertion is not exaggerated the tables following will amply assert. Therefore, in addition to recording the usual data for the analyst, the physician or subject should also note, if possible, the administration of any drug capable of simulating the usual reactions, its quantity and the time for which it has been given. Attention to this detail will often save both analyst and physician possible embarrassments from error, or even from serious mis-

takes, and a life may sometimes pay for the neglect. Further comment on this topic would take up too much space, so the data following will be relied upon to bring home to every pharmacist present this side of the question.

CLASSIFICATION OF GROUPS.

The drugs and chemicals that affect the urine may be, for sake of convenience, divided into groups according to the effect produced, *i. e.*, the reactions they afford simulating those of the normal or abnormal secretions, in other words, according to the fallacies they introduce into the analysis of urine. They would then be classified as follows by their reactions in the urine: Those which cause a reaction simulating the usual reactions of (1) *Albumin*, (2) *Sugars*, (3) *Uric Acid and Urates*, (4) *Biliary Matters*, (5) *Indican*, (6) *Acetone: Di-Acetic Acid*, (7) *Blood*, (8) *Chlorides*, (9) *Phosphates*, (10) *Sulphates*. Of these, the last three are usually of less importance. It will suffice to say here that the administration of large doses of any of these salts will naturally cause a corresponding increase in the amount in the urine. Bromides and iodides will react as chlorides by the silver test; such can be differentiated by the usual precautions. Be sure that your patient is not taking daily doses of sodium phosphate before you report an excess of phosphates, that will lead the physician to a diagnosis of complete breaking down of the nervous system! The other classes may now be taken up in detail.

ALBUMIN FALLACIES.

(1) *Albumin.*—The drugs and synthetics that may simulate the albumin reactions with the usual tests—nitric acid, acetic acid, picric acid, ferrocyanide, tungstate and mercuric iodide solutions—may be subdivided into several groups. Of these, alkaloids, proteids, essential oils and resins, phenol-like bodies (creosote, phenol, cresol, etc.), synthetic alkaloids, drugs like cantharides, etc., that cause albuminuria, and certain unclassified compounds, are practically all that need be mentioned. As will be seen, the list includes no small number of substances, and while an error caused by any of them may usually be discounted if it is known what one of these groups is being given the patient, at times the differentiation between pathological albumins and fallacious substances is exceedingly difficult. It may be safely said that the "heat test" combined with the "nitric acid test" will generally differentiate between albumins and bodies that simulate their reactions. Certain essential oils and resins will be the most likely to interfere here; the precipitate from these is almost always soluble in alcohol or ether—that from albumin is *not*. Saponified fats in the urine will cause a turbidity or cloud with acids, removed by ether or benzene. Turpentine, copaiba, camphor, buchu, grindelia, etc., are in this class. With the "picric acid test," mercuric iodide, ferrocyanide, etc., tests, there is a greater chance for error, since these precipitated alkaloids and proteids and

many synthetics in a way simulating the albumin precipitate closely. Therefore, these last tests cannot be relied on alone without checks.

The alkaloids of cinchona, caffeine, hydrastine, theobromine, morphine, piperidine, piperazine, lysidine, etc., are about the only ones given in doses large enough to cause their appearance in urine in sufficient quantity to give a reaction; these should be particularly guarded against. The precipitates of these bodies, with the reagents mentioned, are almost all dissolved by aid of heat, or by appropriate solvents; caustic alkalies, which dissolve albumin, will accentuate the precipitate. Morphine will often appear in the urine of opium habitues in sufficient amount to be precipitated by picric acid and similar reagents. The substances that cause albuminuria are well known. This action must also be considered in testing urine, and here is a good example of the need of knowing if the patient is taking any drug. Cantharides, phosphorus, phenols, creosote, pental, male fern and certain corrosive poisons cause albumin to appear in the urine if sufficient is taken. Bearing in mind the effect above mentioned, the analyst should have little trouble in determining positively the presence or absence of albumin, unless in exceptional cases, but the necessity of knowing causes of error need scarcely be referred to. In case of doubt, separation and appropriate treatment of the precipitate will reveal its nature. The so-called "biuret reaction" is very useful for this purpose. The precipitation of phosphates and urates is too well known to need mention.

SUGAR FALLACIES.

When we come to the second class, sugars (using this word in its accepted meaning in urinalysis), one almost loses faith in the standard tests in the confusion he meets, for the number of synthetics and drugs that simulate the sugar reactions is very great. The sugar reactions are the ones most affected by drugs in general, and are the most difficult to confirm. It is almost absolutely essential that the analyst should know if any drug is being taken when testing urine for sugars, especially if he relies upon the "copper tests," for there are fifty or more synthetics that will reduce copper solutions if they have been taken in large enough doses and for long enough time almost exactly as the urine would do if it contained sugar. Besides the synthetics and drugs a number of normal and abnormal constituents of urine reduce copper solutions, but these are well-known and need no further mention. With a urine of unknown history, copper solutions (and bismuth to a less degree) are unreliable; they can at best serve only as a general guide to the presence or absence of sugar, and must not be taken as conclusive. Other reagents based on the reducing action of urine sugars have the same fallacy; even the much-vaunted "phenylhydrazine test" has exceptions—thymol, menthol, aldehydes and eucalyptol, combined with glycouronic acid and albumin, etc. Taking all things into

consideration, I feel safe in saying that the nearest approach to an absolutely reliable test for sugar in urine is the "fermentation test," and this has the draw-back of being slow and requiring exact conditions. However, this discriminates between sugar and all its synthetic imitations without fail, although it is not very delicate. The polariscopic tests are also affected by certain of the synthetics—the phenetidin derivatives (phenacetin, acetophen, etc.), which render urine lævorotary, being an instance, so cannot be relied on to differentiate unless it is known that no drug affecting light is being taken. There will be a very appreciable error with many of the essential oils and resins (see copaiba).

It must not be thought from the above remarks that all the commonly used tests for sugar in urine are wholly worthless because of these interfering drugs; far from it. The caution to be made is not to put too much reliance on a single test in a urine of unknown origin and history. When used with a knowledge of the drugs being administered the error can be discounted; without this knowledge results obtained must be interpreted by the manner and degree of reaction and should be checked by the phenylhydrazine or fermentation tests. Perhaps this phenylhydrazine test, if properly carried out, is the safest of all to use in the hands of an experienced analyst, since it has fewer disturbing factors, and by using it as a check to uncertain reactions with copper solutions the chance of error is greatly diminished. Of course it will often happen that we will not have the history of a urine that gives us anomalous results: what shall we do in such cases? I have found that a very good method for proving the presence or absence of sugar in a urine which is suspected to contain some synthetic derivatives is to estimate the total amount of reduction by a volumetric solution of copper; then, if this reduction is in excess of the reduction that would be caused by the suspected drug in ordinary doses, the remainder proves the presence of sugar. But some will say "How can we estimate the reduction caused by an unknown drug in unknown quantity?" In answer to this I would say that from a great number of experiments on numerous drugs, I found that the reduction caused by average doses is about equal to the reduction represented by this: "Discharge of blue color of 1 part of Fehling's Solution by 5 parts of urine, formation of cloudy yellowish-red color in mixture and precipitation of a flocculent yellow precipitate containing a *small* amount of red copper oxide at the bottom." As will be at once remarked, this about represents what is commonly termed "heavy traces of sugar," and it will show how such a reaction may be falsely attributed to sugar in a urine of unknown history. I do not mean to say that this is a hard-and-fast limit of reaction, because it will be varied in depth by the amount of drug that has been taken, the amount present in the urine and its own powers of reduction; still I can confidently offer it to my fellow-members as being a valuable help when its limits are considered. A further and better safeguard

in case of doubt is to test the urine for the presence of the derivatives that appear in urine as the result of administering drugs—if no reaction is given by tests for the suspected groups it may be taken for granted that no synthetic or drug products are present, or if they are, the amount is so small that it will not cause appreciable error. Tests for the eliminative products of the chief groups of synthetics will be given in another place, and, as it is possible to classify most of them according to a few "radicles," such testing will not take much time. It is also possible to differentiate between probable present synthetic derivatives in the urine by applying the usual tests in proper order. Many of those that reduce copper solutions do not affect bismuth, these again will not all affect carmine and picric acid solutions, and so on. Therefore, a reduction of copper solution not confirmed by the other tests is presumptive evidence that it is caused by some drug or by the well known urinary substances causing such reduction. The manner in which the reaction appears, its rapidity, permanence, color changes and appearance after a few hours, are also valuable guides to a safe conclusion.

From data obtained by administering representatives of the principal groups of drugs and synthetics to patients in varying doses and for varying times, and then collecting their urine, both total daily passage and some particular emission, and testing it with the common "sugar tests," I would offer the following conclusions which I think are very nearly accurate. Special precautions were taken to eliminate disturbing factors and both healthy and diseased patients were subjects:

1. "There is an appreciable reduction of copper solutions by the urine when 30 grains of the commonly used synthetics of the acetanilid and phenetidin groups, and also with a few other groups in varying degree, have been taken during the day, this reduction appearing most marked in the urine passed during the night or in the following morning."

2. "Ten-grain doses of the above groups, if not repeated, will not cause noticeable reduction; if 20 to 30 grains are taken within a few hours, the urine passed soon after will promptly reduce copper solutions by heat."

3. "Daily administration of many of the synthetics, such as salol, salophen, naphthols, benzoic acid compounds, and some of the phenols and cresols, will impart reducing properties to urine after a few days use."

4. "Five to ten-grain doses of many of the rapidly eliminated synthetics, such as amyl derivatives, antipyrin, chloral compounds, antipyrin derivatives, drugs having an active de-oxidizing nucleus, etc., will often cause a markedly reducing urine within a few hours, reducing both copper and bismuth solutions."

5. "Comparatively small doses of such drugs as arbutin, chloral, drugs eliminated as chloral compounds, aldehydes, kairine, phenylhydrazine derivatives, etc., make urine strongly reducing and also often affecting polarized light."

6. "The main sources of error in testing urine for sugar will come from the continued administration of many of the synthetics at short intervals in the usual doses; single or widely-separated doses of most of these have little effect, as the dilution is too great in the urine."

7. "By allowing sufficient time for the drugs to be eliminated from the system, usually only a few hours when not taken long enough to saturate the urine, the error their presence in urine causes can be reduced to a minimum. In cases of doubtful sugar reactions, stop the treatment for at least twenty-four hours before collecting samples of urine."

8. "When drugs have been administered for some time, the 'morning urine' will contain the greatest amount of their derivatives."

CLASSIFICATION OF SUGAR FALLACIES FROM DRUGS.

Drugs, including synthetics, of course, that cause the urine to take on a reducing action, may for convenience be classified as follows: those affecting (1) copper tests; (2) bismuth tests; (3) carmine tests; (4) picric acid and alkali tests; (5) phenylhydrazine tests; (6) other tests.

Class (1), drugs affecting copper tests, comprises the greatest number of all the classes; these are: (*a*) Acids and many of their derivatives; of *these* benzoic, carbolic, cinnamic, gallic, tannic, picric, pyrogallic, salicylic, hippuric, camphoric, hydrocinnamic, quinic and mandelic are the most important. (*b*) Synthetics themselves and their derivatives—acetanilid, antipyrine, aniline, acetone, aldehyde, amyl alcohol, benzol, bromal, camphor, chloral, cresol, formaldehyde, guaiacol, naphthol, naphthalin, phenacetin, phenetidin, phenylhydrazine, phenols, resorcin, salol, terebene, thiol, urethane. (*c*) Alkaloids, natural or synthetic, having reducing action; most important are: morphine and its synthetic derivatives, cinchona alkaloids, piperazine, lysidin, etc. (*d*) Certain vegetable drugs, as arbutin, asparagus, copaiba balsams, etc. (*e*) Unclassified synthetics—acetal, airol, antinervin, alumnol, amylene, anthrarobin, antinosin, aspirin, acetospirin, diuretin, europhen, hydracetin, hydroquinone, kairine, hypnal, pental, urethane, urotropin. (*f*) Certain normal and abnormal organic constituents of urine may be added to our list—these are well known and need not be mentioned. The presence of methylene blue in urine will, of course, obscure the copper tests; this drug is rapidly eliminated and is often used. Such urine, which will be of a blue color, must be cleared before applying the usual tests, which can readily be done by a solution of mercuric nitrate. Lead solutions cannot be used for this purpose, as they precipitate sugar from urine.

Class (2) Bismuth Tests (solutions of different formula) are affected by fewer substances than copper; the list of the most important ones is: Antipyrin, arbutin, heroin, morphine, phenylhydrazine, pyramidon, sulphonal, sulphur compounds, salol, trional, thiol, tumenol, thiosinamine, turpentine, the "rhubarb group" and a few of Class (1)—(*a*) and the

derivative synthetics of these substances. The urinary elements that affect the bismuth test are too well-known to need reference here.

Class (3) Carmine Solutions. The carmine test solutions are particularly affected by alkalies (which decolorize), gallic, tannic, pyrogallic, chrysophanic and carbolic acids and compounds containing them, iron salts and the synthetics that have a powerful reducing action of Class (1). Dextrin, milk sugar, inosite, pepsin and peptone also affect this test.

Class (4) Picric Acid Test Solutions. Drugs affecting picric acid solutions are the synthetics of Class (1), *a*, *b* and *e*, when in large doses, alkaloids, natural and artificial, the emodin containing group of drugs, santonin, creatinine, etc.

While the last two lists look small, it must be remembered that many of the synthetics may affect the carmine test from reduction, nullification of color and decomposition, and that many will affect the color changes of the picric acid test by reducing properties, precipitating the picric acid and by masking the mahogany red color of the test by reactions between themselves and the alkali, such as will occur with the Emodin Group. My work on these last two tests has not been as full as on the first two, and I cannot speak positively as to fallacies likely to occur beyond those I have given.

Class (5) Phenylhydrazine Test. The drugs affecting this test seem to be fewer in number than for any other; eucalyptol, menthol, thymol, and similar drugs, aldehydes and ketones are the most important; these form compounds with glycouronic acid in the urine that gives a precipitate with phenylhydrazine closely resembling glucosazone crystals. The albumins also affect this test; they may be very nicely removed by shaking 15 to 20 Cc. of urine with excess of fresh animal charcoal, which will remove the albumins and coloring matters, leaving the filtered urine in perfect condition for the test. Considerable experience is required to positively identify the yellow crystalline tufts of glucosazone under the microscope.

URIC ACID AND URATES FALLACIES.

The drugs affecting the tests and estimation of uric acid and urates are chiefly those which are eliminated partly as hippuric, benzoic and salicyluric acids, drugs that cause excessive elimination of uric acid from the system, and drugs whose derivatives in urine are precipitated by the usual "acid tests" commonly employed to demonstrate this acid. Prominent among the second class are the piperazine and hexamethylene-tetramine (urotropin) compounds, cinchona salts, lithia salts, etc. In the latter class are many synthetic derivatives of benzoic and salicylic acids, those derived from synthetics decomposed by acids, etc. These may be separated from their combinations and precipitated by acids. Easily oxidized bodies will interfere with estimation by potassium permanganate. Paraldehyde and its compounds cause excessive elimination of urea, a possible source of error.

FALLACIES AFFECTING BILE TESTS.

(4) Bile and biliary pigments may be imitated by drugs of the emodin-containing group—rhubarb, cascara, senna, etc., and also by santonin. Such urine will be colored a deep yellow color, which will be changed to red by alkalies and restored by acids. This coloring-matter can be extracted from the urine by ether after acidifying. The coloring-matter of the emodin group is decolorized by reducing agents, that of santonin is *not.* Aniline derivatives increase the elimination of bile.

FALLACIES AFFECTING INDICAN TESTS.

(5) The reactions of indican will often be given by urine containing the derivatives of certain synthetics that have been taken internally. Aniline, nitrobenzene, phenols, indol, phenocoll, salocoll and some of the phenetidin derivatives and their compounds will give the reaction for indican with the HCl and CaClO test, and the blue color formed will be similarly extracted by chloroform. If this test is to be at all relied on it must be positively known that the urine is free from these disturbing factors; indeed, most of these actually are eliminated as indican.

FALLACIES AFFECTING ACETONE TESTS.

(6) Drugs that affect the acetone tests by causing the appearance of acetone in the urine of patients taking them are the acetone synthetics, hypnone, nitrobenzene, cresols and certain aldehydes. These give both the "iodoform" and "indigo" tests. The red color produced with di-acetic acid by ferric chloride is also given by formic and acetic acids, the cinchona alkaloids and products following the administration of antipyrin, kairine, thalline, carbolic and salicylic acids and aspirin.

FALLACIES AFFECTING BLOOD TESTS.

(7) The usual tests for blood in urine dependent on the reaction with guaiacum and hydrogen peroxide are interfered with and often closely imitated by the iodides, di-acetic acid, aniline salts and drugs that cause haemaglobinuria. After the administration of the synthetics containing iodine this test is wholly unreliable, and recourse must be had to the microscopic recognition of haematin crystals.

REACTIONS OF IMPORTANT GROUPS.

The errors and fallacies in urine testing caused by drugs as shown in the foregoing pages make it quite desirable that we should have tests by which we can demonstrate the presence or absence of these or their derivatives. In spite of the great number in use, the synthetics can almost all be classified into a comparatively small number of groups, according to the composition of the elementary body from which they are derived and by the form or substance as which they are eliminated in urine. For in-

stance, all the derivatives of the phenetidin group are voided mainly as para-amidophenol sulphuric acid, sulphate or glycosuronate; those containing gallic or tannic acids as gallic or pyrogallic compounds, the antipyrine derivatives as antipyrine alone or as a salt of some organic acid, salicylic acid groups as salicyluric acid and salicylurates, etc. Many drugs impart peculiar and characteristic colors to the urine, which is often a guide to the nature of the drug administered—carbolic acid, sulphonal, rhubarb and methylene blue, for example. Therefore, if in testing a urine of unknown history there is reason to doubt a certain reaction and to believe that the error is caused by some drug, attention to its color, odor, etc., and the application of a few "group tests" will often settle the difficulty. But this is not as safe as knowing positively what drug has been taken by the patient.

The most important of the synthetic "group reactions" are these:

Acetanilid and Derivatives—"Indophenol Reaction."—Heat 15 Cc. of urine in a test-tube with 5 Cc. HCl, cool, and add a few drops of 3 per cent. aqueous sol. carbolic acid (phenol), and then a few drops of fresh sol. CaClO. A red color is produced which is turned blue by excess of water of ammonia.

Antipyrine and Derivatives.—A deep red color is caused by addition of solution of ferric chloride to the urine; a solution of sodium nitrite added and the urine acidified gives a green color. Precipitate is formed with picric acid.

Phenetidin and Derivatives—"Para-amidophenol reaction."—Boil 15 Cc. urine with about 4 or 5 Cc. of HCl, cool, and add 5 drops of a 1 per cent. aqueous solution of sodium nitrite, then add a few drops of 5 per cent. alcoholic solution of *a*-naphthol. On adding KOH to alkalinity a red color is produced, turned red-violet by HCl. Or, boil urine with HCl, cool, and add a few drops of aqueous solution phenol, then a few drops of chromic acid solution—red color, turned blue by excess of aqueous ammonia.

Naphthol and Derivatives.—Heat 15 Cc. urine in test tube with potassium chlorate and excess of HCl; a yellow color is formed which is extracted by ether. Shake up cool mixture with ether, separate and evaporate ether, dissolve yellow coloring matter in a little water and add a few drops of aqueous solution of resorcin and 1 drop of strong aqueous ammonia—a blue-green color is produced, turning cherry-red with nitric acid. Heating urine with sugar and strong sulphuric acid gives a violet color (furfurol reaction).

Resorcin and Derivatives.—Evaporate urine to ¼ bulk, add sulphuric acid in excess, cool and shake up with ether; decant ether solution, evaporate and take up residue with water. Ferric chloride will give a violet color. The reaction for naphthol given may be reversed to detect resorcin.

Naphthalin and Derivatives.—Concentrated sulphuric acid gives a dark green color; the urine also gives the "naphthol reaction." β-naphthol in urine gives a blue fluorescence with NaOH in excess.

Chloral and Derivatives.—Chloroform is formed on heating urine with KOH. The distillate from alkaline urine with a few drops of alc. sol. thymol and KOH gives a deep violet color. Chloral can be separated as such.

Phenol and Derivatives.—Urine gives a bluish color with ferric chloride, a precipitate with bromine water and a dark red precipitate with Millon's reagent. Can also be detected by reaction with CaClO.

Aniline and Derivatives.—Best detected by shaking out aniline from urine with ether and applying usual tests to extractive. Urine gives nitrobenzene reactions. Usually eliminated as para-amidophenol sulphate, q. v.

Salicylic Acid and Derivatives.—Acidify urine, heat and cool; shake with ether, separate and evaporate and take up residue with very dilute KOH—ferric chloride gives violet color. The urine alone will also give a violet color with ferric chloride solution.

Gallic Acid and Derivatives.—Urine is generally dark colored. Ferric chloride solution gives green-black color with urine.

Benzoic Acid and Derivatives.—Usually eliminated as hippuric acid; if free or combined benzoic acid is present, treat urine as for salicylic acid and add ferric chloride—gives a pinkish precipitate.

Acetone and Derivatives.—Give acetone reactions in urine.

Urethane and Derivatives—Aldehydes.—Urine or distillate reduces silver solutions on heating with alkali. Urine gives aldehyde reactions.

Piperazine and Derivatives.—Precipitated by alkaloidal reagents—picric acid.

Guaiacol and Creosote Derivatives.—Separate guaiacol from acid urine by distillation and identify by usual tests.

Emodin-containing Group.—Yellow color of urine is extracted by ether, and this is turned red by alkalies and back to yellow by acids, and is decolorized by reduction. The color from santonin is not altered.

FERRIC CHLORIDE REACTIONS.

Ferric chloride test solution gives a number of very characteristic color reactions with urine containing derivatives of many of the synthetics. The test is applied by adding a few drops of ferric chloride solution to about 15 Cc. of urine in a test-tube and noting color of precipitate. Usually a precipitate will be formed with the phosphates; the color reaction will appear best by precipitating phosphates first. This test is very useful, and I believe it has wide applications: I hope to take up the line in the near future to work out a line of reactions with urinary constituents. The colors given with ferric chloride solution are:

Acid salicylic.....Violet color.	Hydroquinone..Blue, turning yellow.
Acid gallic .....Green-black color.	Kairine.....Violet-red color.
Acid benzoic .....Pinkish precipitate.	Diaphthol .....Green color.
Acid carbolic.....Deep blue color.	Phenocoll.....Cloudy red-brown.
Alumnol .....Blue color.	Pyrocatechin ...Green, violet by ammonia.
Antipyrine .....Red color.	Resorcin.....Dark violet color.
Aspirin .....Red-violet color.	Salol .....Deep violet color.
Arbutin... .....Deep blue color.	Salicin .....Red-violet color.

CONCLUSION.

As a guide to the many synthetic remedies and drugs now in use, their chemical composition, form or substance in which eliminated and the effect on urine tests of these, the following table is appended :

TABULATED DATA AND NOTES: SHOWING EFFECT OF DRUGS ON URINALYSIS.

DRUG.	CHEMICAL STRUCTURE.	ELIMINATED AS:	EFFECT ON URINE TESTS AND DETECTION.
Acetal	Di-acetic ether	Acid acetic	Fallacy caused—di-acetic acid. Gives red color with ferric chloride.
Acetanilid	Phenylacetamid	Para-amidophenol sulphate	Reduces copper sol. Urine laevorotary. Urine gives p-amidophenol reaction.
Antipyrine	Phenyldimethyl pyrazolone	As antipyrine—rapidly	Reduces bismuth solutions; urine gives red color with ferric chloride; green with HNO_2.
Arbutin	Glucoside, from arbutus	Hydroquinone and dextrose	Reduces copper sol. at once. Gives blue color with ferric chloride.
Antikamnia	Acetanilid compound	Same as acetanilid—q. v.	Reduces copper sol. after large doses. Gives p-amidophenol reaction.
Aristol	Dithymol di-iodide	Iodides and thymol compounds	Gives ppt. with phenylhydrazine. Gives blue color with guaiacum-blood test.
Acetopyrine	Antipyrine acetsalicylate	Antipyrine, salicylurate, etc.	Reduces bismuth sol. same as antipyrine and gives same reactions.
Aniline	Amido-benzene	Para-amidophenol sulphate	Gives reactions with indican tests. Increases bile. P-amidophenol reaction.
Airol	Bism. oxyiodogallate	Iodides, gallic acid, bismuth	Excess reduces copper sol. Urine gives green-black color with ferr. chlor.
Amyl compounds	Amyl alcohol derivatives	As amyl derivatives	Sometimes eliminated as substances having reduced action on copper sol.
Amylene hydrate	Tertiary amyl alcohol	As amyl derivatives	Same as above in characteristics.
Antinosin	Tetraiodo-phenolphthalein	Phenolphthalein sulph. iodide	Gives red color with alkalies; blue color with guaiacum (blood test).
Antithermine	Acetphenylhydrazine	Phenylhydrazine compounds	Reduces copper and bismuth sol. Precipitates albumin and sugar if present.
Antispasmin	Narceine sod. salicylate	Narceine salicylurate, etc.	Gives ppt. with picric acid (albumin fallacy). Salicylic acid reactions.
Antinervine	Acetanilid-sod. sal. compound	Same as acetanilid—q. v.	Large doses reduce copper sol. Same reaction as acetanilid—q. v.
Antisepsin	Para-bromacetanilid	Same as acetanilid—q. v.	Gives same reactions as acetanilid—q. v.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Alumnol	Alum. naphthol sulphonate	A-naphthol sulphonate	Marked reducing agent. Urine gives blue color with ferric chloride.
Amylene	Pentane, C_5H_{10}	Aldehydes	Reduces copper sol. and gives aldehyde reactions. Reduces bismuth sol.
Analgen	Quinoline O-oxy-benzoylamide	Benzoic acid—quinoline compds.	Gives reactions of benzoic acid—q. v. Sometimes simulates uric acid ppt.
Anthrarobin	Chrysophanic acid deriv.	Part unaltered, part benzoic acid	Gives red color with alkalies, turned yellow by acids. See "Emodin Group."
Asaprol	Calc. b-naphthol monosulphon.	Eliminated unchanged	Urine has very dark color. Gives reactions of naphthols—q. v.
Acetospirin	Antipyrine aceto-salicylate	As antipyrine and salicylic acid	Reduces bismuth sol. Same reactions as antipyrine—q. v.
Aspirin	Aceto-salicylic acid	Acetic and salicyluric acids	Reduces copper sol. if in excess. Gives red-violet color with ferr. chlor.
Asparagin	Principle of asparagus	Succinic acid	Gives flesh-colored precipitate with ferric chloride.
Acid, benzoic	Benzoyl hydrate	Benzoic and hippuric acids	Reduces copper sol. in large doses. Gives precipitate simulating uric acid by usual reagents.
" carbolic	Phenol; phenyl hydrate	Phenol-sulphuric acid	Excess affects copper tests. Dark urine. Red color with "Millon's reagent."
" cinnamic	Phenylethylene derivative	Glycouronic and hippuric acids	Reduces copper sol. Red color with ferr. chlor. HCl precipitates as uric acid.
" chrysophan	Di-oxymethylanthraquinone	Unchanged and as benzoic acid	Reduces copper and carmine sol. Urine highly colored. Reddened by alkalies.
" gallic	Benzene derivative	Gallic and gallo-uric acids	Excess affects copper sol. and carmine test. Urine colored green-black by ferr. chlor.
" pyrogallic	" "	Same as above	Same as above. Gives green-black color with ferr. chlor.
" tannic	" "	Same as above	Same as above. Gives green-black color with ferr. chlor.
" picric	Tri-nitrophenol	Picric acid and picrates	Precipitates albumin if present. Gives red color with sugar and alkali.
" salicylic	Ortho-oxybenzoic acid	Salicylic and salicyluric acids	Excess reduces copper sol. Urine "smoky color." Violet color with ferric chloride.
Benzanilid	Benzoic acid hom. of acetanilid	Same as acetanilid and benz. acid	Reduces copper sol Gives para-amidophenol reaction.
Benzosol	Benzoyl-guaiacol	Guaiacol benzoic acid	Excess affects copper and bismuth tests. Gives guaiacol reactions.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Benzol compounds	Benzene—CH derivatives	Derivatives of benzene	Some of these are reducing agents.
Bromoform	Tribrom-methane	Unchanged	Reduces copper sol. Detected by distillation and special tests (as $CHCl_3$).
Bromal	Tribromaldehyde	Urobromalic acid and bromoform.	Reduces copper sol. but not bismuth. Reactions similar to chloral.
Benzonaphthol	B-naphthol benzoate	B-naphthol—hippuric acid.	Simulates excess of uric acid by usual tests. Large doses cause reducing action in urine. Gives naphthol reactions—q. v.
Betol	B-naphthol salicylate	B-naphthol—salicyluric acid	Precipitated by nitric acid as albumin. Gives naphthol reactions.
Bromol	Tribrom-phenol	Tribromphenol sulphonic acid	Precipitated by nitric acid simulating albumin. Gives phenol reactions.
Bromopyrine	Antipyrine monobromate	Same as antipyrine—q. v.	Reduces bismuth solutions. Gives antipyrine reactions—q. v.
Blennostasine	Cinchonidine bromide	Cinchonidine ethylsulphate	Precipitated by picric acid simulating albumin. Ppt. soluble in alcohol.
Camphor	Terpene derivative	Campho-glycuric acid	Precipitated simulating albumin by nitric acid. Ppt. soluble in alcohol.
Cresol	Cresylic acid	Unchanged—cresol sulphate	Excess causes albuminuria. Dark urine. Sol. thymol and KOH give violet color with distillate.
Creosote	Guaiacol, veratrol, etc.	As guaiacol compounds, etc.	Gives albumin reaction with nitric acid. Reduces copper sol.
Creosotal	Creosote carbonate	Same as above	Same as above. Both drugs cause very dark-colored urine.
Cresalol	Cresol salicylate	Cresol salicylurate and urate	Gives albumin reaction with nitric acid. Ppt. as uric acid with HCl.
Creolin	Cresylic acid compound	About as cresol—q. v.	Forms compounds with copper sol. Gives phenol reaction and dark urine.
Cresol compounds	Cresol and acid compounds	Same as cresol—q. v.	Gives same reactions as cresol.
Chloroform	Tri-chlormethane	Eliminated unaltered	Reduces copper sol. hot. Alc. sol. thymol and KOH give violet color with distillate.
Chloral	Tri-chloraldehyde	Urochloralic acid and chloral	Reduces copper sol. but not bismuth. Heat urine with KOH—odor of $CHCl_3$.
Chloral-caffeine	Chloral and caffeine	Same as chloral—q. v.	Has same reactions as for chloral.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Chloracetone	Acetone chloral compound	Acetone-chloroform	Gives acetone reactions. May reduce copper. Gives acetone in distillate.
Chloretone	Trichlor 3, butyl alcohol	Acetone-chloroform	Same reactions, etc., as above.
Citrophen	Phenacetin hom. with citric acid.	Ac. phenetidin derivative	Excess may reduce copper solutions. Gives para-amidophenol reaction.
Chloralamide	Chloral formamide	Urochloralic acid; formamide	Reduces copper as chloral. Same reactions as chloral.
Duotal	Guaiacol carbonate	Same as guaiacol—q. v.	Urine gives guaiacol reactions. Affects carmine test.
Diuretin	Theobromine sod. salicylate	Theobromine salicylurate	Simulates albumin reaction with picric acid and ferrocyanide. Salicylic acid reaction.
Diabetin	Levulose-sugar	As oxidization products	No effect on urine when taken in body in ordinary dose.
Dionin	Ethyl morphine chloride	Morphine salts—q. v.	Simulates albumin reaction with picric acid, etc. Excess reduces strongly.
Dormiol	Amylene chloral	Same as chloral and amyl—q. v.	Reduces copper sol., not bismuth. Gives reactions same as chloral.
Eigon alpha	Sodium iodoalbuminate	Iodides	Gives blue color with guaiacum (blood test); reactions of iodides.
Eucalyptol	Cineol	Eucalyptol and compounds	Gives precipitate with phenylhydrazine simulating sugar. Urine dark and odorous.
Eugenol	Oxymethyl-allyl-benzene	Similar to phenols—q. v.	Simulates albumin reaction with nitric acid. Dark urine. See "Phenol."
Exalgin	Methyl acetanilid	Para-amidophenol sulphate	Large doses reduce copper sol. Gives para-amidophenol reactions.
Euphorin	Phenylethyl urethane	Oxyphenylurethane sulphate	Reduces copper and bismuth sol. Sometimes gives aldehyde reactions.
Euquinine	Quinine carbonic ester	Quinine salts—q. v.	Simulates albumin reaction with picric acid, ferrocyanide, etc. Quinine reactions.
Europhin	Di-isobutylorthocresol iod.	Cresylic acid—iodides	Urine gives blue color with guaiacum (blood test) from iodides. See Cresol.
Formin	Hexamethylene tetramine	As such and formaldehyde	If decomposed by alkalies reduces copper solutions. Orange ppt. with bromine water increases urea elimination.
Ferropyrine	Antipyrine and iron comp.	As antipyrine	Reduces bismuth sol. Gives antipyrine reactions.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Gallactophenol	Pyrogallol derivative	Phenol and gallic acid derivatives.	Reduces copper sol. Gives reactions for pyrogallol. Black-green with ferric chloride.
Gallobromol	Di-brom gallic acid	As gallic acid and bromides	Excess reduces copper and carmine sol. Urine colored green-black by ferric chloride.
Garantose	Benzoylsulphonic imide	Same as saccharin—q. v.	No effect in ordinary amounts. Can be separated from acid urine by ether.
Guaiacol	Pyrocatechin mono methyl ether.	Phenol salicylic acid; guaiacol sulph.	Urine often reducing. Guaiacol is separated by distillation with alkali.
Hedonal	Methylpropyl carbamic acid ester.	Aldehydes	No effect unless in large doses. Then gives aldehyde reactions.
Holocain	Phenetidin-phenacetin comp.	P.-amidophenol sulphate	Seldom used internally. Urine will give then para-amidophenol reactions.
Hydracetin	Aceto-phenyl hydrazine	Phenylhydrazine	Reduces copper and bismuth sol. Forms yellow crystals with glucose.
Hemogallol	Gallic acid compound	Pyrogallic acid	Affects carmine test. Gives gallic acid reactions.
Heroin	Di-acetyl morphine	Morphine salts	Reducing effect if in large amount, also simulates albumin with picric acid.
Hydroquinone	Para-di-oxybenzene	Similar to resorcin—q. v.	Excess in urine reduces copper sol. Urine has green-black color.
Hypnal	Chloral-pyrazolone compound	Chloral-antipyrine	Reduces copper sol. strongly, also bismuth. Gives antipyrine and chloral reactions.
Hypnone	Acet-phenone	Acetone; benzoic, hippuric acids.	Gives acetone reactions. Large doses simulate excess of uric acid.
Ichthyalbin	Ichthyol-albumin	Ichthyol ethylsulphate	Blackens bismuth sol. Gives peculiar odor to urine.
Iodol	Pyrrol-tetra-iodide	Iodides; pyrrol derivatives	Excess causes albuminuria Gives blue color with guaiacum from iodides.
Kryofine	Methoxy-acetphenetidin	Para-amidophenol sulphate	Reduces copper sol. Gives para-amidophenol reaction.
Kairine	Oxytetra-hydro-methyl-quinoline.	Kairine ethyl sulphate	Reduces copper sol. Urine gives violet color with Fe_2Cl_6—fuchsin-red color with HCl and CaClO sol.
Losophan	Cresol iodide	Iodides; cresol—q. v.	Simulates albumin reaction with nitric acid and blood test with guaiacum.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Lysidine	Methyl glyoxalidin base	Similar to piperazine—q. v.	Simulates albumin reaction with picric acid, ferrocyanide, etc. Sol. in $CHCl_3$.
Lactaphenin	Lactyl phenetidin	Para-amidophenol sulphate	Excess reduces copper sol. Gives indophenol and amidophenol reactions.
Lycetol	Dimethyl piperazine tartrate	Piperazine salts	Simulates albumin reaction with picric acid, etc. See piperazine.
Malakin	Salicyl p-phenetidin	P-amidophenol sulphate	Reduces copper sol. Urine gives para-amidophenol reactions.
Menthol	Menthol	Menthol glycouronic acid	Simulates sugar reaction with phenylhydrazine. Odor detected by heating with KOH.
Methylene blue	Tetramethyl thionine salt	Methylene blue	Obscures copper tests. Clear urine with sol. mercuric nitrate and filtering.
Methacetin	Para-oxymethyl acetanilid	P amidophenol sulphate	Reduces copper sol. after large doses. Gives indophenol reaction.
Morphine	Morphine and salts	Morphine salts	Excess simulates albumin reaction by picric acid and reduces copper and bismuth sol.
Naphthalin	Naphthalene	Naphthol-glycouronic acid, etc	Urine is very dark and is colored violet by heating with sugar and acid sulph.
Naphthols	Phenols of naphthalene series	Same as naphthalin	Sometimes form reducing compounds. Urine gives blue fluorescence with ammonia water.
Nitrobenzol	Nitrobenzene	Indican, acetone, etc.	Gives indican reactions and also acetone reactions.
Nosophen	Tetraiodo-phenolphthalein	Iodides, phenolphthalein	Simulates blood test with guaiacum from iodides present.
Nirvanin	Oxybenzoic acid methyl ester	Hippuric acid compounds	Reduces copper sol. Gives ppt. with HCl, simulating uric acid, causes excess of urates to appear.
Neurodin	Acetyl-p-oxyphenyl urethane	Phenolsulphuric acid	Sometimes forms aldehyde and acts as reducing agent.
Oxaphor	Oxy-camphor	Oxy-camphoric acid	Simulates albumin reaction with nitric acid; ppt. soluble in alcohol.
Orthoform	P-amido m-oxybenzoic acid	Hippuric acid chiefly	Reduces copper sol. Simulates excess of uric acid from hippuric acid—eliminated.
Orexin	Phenyldihydro quinazolone	Quinazolone derivatives	May simulate albumin reactions with alkaloid reagents. Indophenol reaction.

Drug.	Chemical Structure.	Eliminated as:	Effects of Urine Tests and Detection.
Orphol	Bismuth beta-naphthol	Naphthol derivatives	Gives napthol reactions. Urine dark colored. Sometimes reducing agent.
Pyramidon	Dimethylamido antipyrine	Similar to antipyrine—q. v.	Reduces copper and bismuth sol. Gives antipyrine and amidophenol reactions.
Paraform (aldehyde)	Tri-oxymethylene	Formaldehyde	Reduces copper sol. in alkaline urine from liberation of formaldehyde—q. v.
Purgatol	Anthrapurpurine diacetyl ester	Oxyanthraquinone	Causes fallacy resembling bile pigment. Urine deep color; red with alkali.
Paraldehyde	Para-acetaldehyde	Aldehyde	Gives aldehyde reactions. Increases amount of urea. Distillate reduces silver sol.
Pental	Trimethyl ethylene	Amyl hydrate compound	Causes albuminuria in large doses. Urine gives precipitate with nitric acid.
Phenacetin	Para-acetphenetidin	P-amidophenol sulph. and glycouronate	Excess reduces copper sol. Urine lævorotary and brown-red after large doses (amidophenol reaction).
Phenocoll	Phenetidin glycoll amide	As such and salts	Gives indican reactions. Ferr. chlor. gives red-brown color.
Phenylurethane	Oxyphenylurethane sulphate	Phenolsulph. acid; aldehyde	Gives aldehyde reactions and reduces copper and bismuth sol.
Piperazine	Di-ethylene di-amine	Piperazine and pip. urates	Simulates albumin reaction with picric acid and ferrocyanides.
Pyoktanin	Aniline colors	Unaltered and combined	Obscures color tests. Gives peculiar color to urine.
Phenylhydrazine	Phenol and hydrazine comp.	As such and as glycouronate	Reduces copper and bismuth powerfully. Forms phenylglucosazone with glucose.
Resorcin	Meta-pyrocatechin	As such and ethylsulphate	Excess causes reducing action. Urine green-black. Resorcin detected as such.
Quinalgen	Quinoline derivative	Quinoline salts	Simulates albumin reaction with alkaloidal precipitants.
Saccharin	Benzoyl sulphamide	Unchanged	No effect in usual doses. Acidify urine with phosphoric acid and shake out with ether; crystals on evap.
Salicin	Glucoside from salix	Salicyluric acid; salicin	Simulates excess of uric acid. Urine gives violet color with ferr. chlor.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detections.
Salocoll	Phenocoll salicylate	Phenocoll salicylurate, etc	Gives indican reaction. Detected by phenocoll reactions —q. v.
Salol	Phenyl salicylate	Phenolsulph. and salicyl. acid	Excess gives reducing action. Urine gives red-violet color with ferr. chlor.
Saliformin	Urotropin salicylate	Partly unchanged and as salicylic acid	Slight reducing effect. Urine gives reactions of salicylic acid.
Santonin	Santonic acid anhydride	Unchanged	Fallacy—bile. Urine deep yellow, turned red with alkali, yellow with acid.
Sidonal	Piperazine quinate	Piperazine urate, benz. acid	Simulates albumin reaction with picric acid, etc. Reactions of piperazine.
Salinaphthol	B-naphthol and salicylic acid	Naphthol deriv. Salicyluric acid	Slight reducing action. Gives naphthol and salicylic acid reactions.
Salipyrine	Antipyrine salicylate	Antipyrine. Salicylic acid	Reduces bismuth sol. slight reduction of copper. Gives antipyrine reaction.
Salophen	Acetylparamido salol	Phenolsulph and salicyl acid	Reduces copper sol. Gives reactions of salicylic acid and para-amidophenol.
Somnal	Chloral and urethane	As chloral. (As phenetidin)	Gives aldehyde reactions and reduces copper sol. Reactions of chloral.
Sulphonal	Diethylsulphondimethyl methane.	Partly unchanged	Blackens bismuth tests. Urine dark colored. Brown ppt. with lead acetate.
Sozo-iodolates	Di-iodophenol sulphonates	Phenolethyl sulph. iodides	Gives blue color with guaiacum blood test from iodides. Reduces copper sol.
Sozolic acid	O-phenol sulphonic acid	Phenolethyl sulphates	Gives slight reducing action in large doses.
Thiocol	Guaiacol pot. sulphonate	Guaiacol-ethylsulphates	Excess gives reducing action. Reactions for guaiacol in distillate.
Thiosinamine	Allyl sulpho-carbamide	Sulphur compounds	Blackens bismuth tests. Gives black precipitate with lead acetate sol.
Thermodin	Acetyl p-ethoxyphenyl urethane	As urethane and acetal	Gives aldehyde and indophenol reactions. Reduces copper solutions.
Thiol	Sulphonated petroleum	Ethylsulphates. Sulphur compds.	Blackens bismuth sol. Marked reducing action. Gives sulphur reactions.

Drug.	Chemical Structure.	Eliminated as:	Effect on Urine Tests and Detection.
Tumenol	Sulphonated bitumen	Ethylsulphates, sulphur compds	As above. Both drugs increase elimination of ethyl-sulphuric acid.
Tannalbin	Tannin and albumen	Pyrogallol and gallic acid	Affects cormine sol. Gives green-black color with ferric chloride.
Terpin hydrate	Turpentine hydrate?	As such and as turpenglycouronic acid	Often gives albumin reaction with nitric acid, ppt. soluble in alcohol.
Turpentine	Mixture of terebenes	Same as above	Sometimes acts as reducing agent. Evap. urine, dissolve out terebene with alcohol and add $SbCl_3$, gives red crystals. Urine has odor of violets.
Terebene	Pinene, terpinene, etc.	Terebene derivatives	Same as above in action.
Thalline	Quinanisol derivative	Unchanged and as derivatives	Has reducing action. Urine colored purple by ferric chloride; ether ext. green.
Thymol	Methylpropyl phenol	Thymol glycouronic acid, etc.	Gives sugar reaction with phenylhydrazine. Red color with sugar and sulph. acid.
Trional	Mercaptan derivative	Methyl and ethyl sulphates	Blackens bismuth sol. Urine colored red, turned violet by acids. V. sulphonal.
Tannopyrine	Antipyrine tannate	Antipyrine—gallic acid	Reduces bismuth sol.; copper slightly. Gives antipyrine and gallic reactions.
Uralium	Chloral urethane	Chloral products	Gives aldehyde reactions. Reduces copper sol. strongly. See chloral.
Urethane	Ethyl carbamate	Aldehydes	Often causes aldehyde reactions to appear, reducing copper solutions.
Urotropin	Hexamethylene tetramine	Unchanged and formaldehyde	Reducing effect if decomposed—formaldehyde. Orange precip. with bromine water.
Uropherin	Lithium benz. theobromine	Theobromine, salicylic and benzoic acids	Gives albumin reaction with picric acid if in excess. See benz. and sal. acids.
Validol	Menthol valerianate	Mentholglycouronic acid, etc.	Gives precipitate with phenylhydrazine resembling glucose. See menthol.
Uresin	Urotropin lith. citrate	Same as urotropin—q. v.	Gives reactions of urotropin. Formaldehyde liberated by alkali and heat.

It is hoped that its length will be atoned for by its value as a reference table, and indeed, it could easily have been made almost twice as long by admitting synthetics of very recent origin, or which are not much used. I have tried to select the most important synthetics that have any action on urine and those most commonly prescribed, and the table is accurate as far as it is possible to make data bearing on the complex problem of drug elimination. The facts under "mode of elimination" have been compiled from the latest and most authorative references, supplemented by numerous experiments by the author. The column "effect on tests, etc." is based on research through many books and periodicals and on actual experiments made, in which many of the drugs were given to patients and the effect on the urine noted. Quite a number of the commoner synthetics, such as antipyrine, acetanilid and phenacetin derivatives and the benzoic and salicylic and gallic acid compounds, were tested in this way in doses of greater or less amount, and for varying length of time given, the urine after administration being collected and tested. This work is naturally slow and tedious, and has occupied my time for the past eight months, almost every day finding an additional fact to be noted in the table. It must be understood that while many drugs are reported as "reducing copper solutions, etc.," this does not mean that all of these drugs invariably cause this action; it should be taken to mean that all of the synthetics mentioned in this connection may cause reduction of cop per solutions if administered in large enough doses and for long enough time. The note is intended chiefly to be borne in mind when working with such bodies.

With the hope that the labor of the past year along these lines will be of help and value to my fellow pharmacists who have occasion to test urine, this paper is respectfully submitted for their approval and use if it is found to have sufficient merit.

Navy Yard, League Island, Pa., September 5, 1901.

Carl G. Hinrichs read the following paper in abstract:

OXYGEN AS A STANDARD FOR THE GASOMETRIC TESTS OF THE PHARMACOPŒIA.

BY CARL G. HINRICHS, ST. LOUIS, MO.

The Pharmacopœia contains only one gasometric process—that for the three nitrites (p. 509); but those commonly used by chemists for peroxide and hypochlorites are much superior to the volumetric processes given, and are therefore recommended for introduction in the new Pharmacopœia.

The difficulty about the practical use of gasometric determinations exists mainly in the supposed necessity of reduction of gas volume to the standard pressure and temperature, 760 mm. and 0° C.

This involves really two equally great difficulties, namely, the accurate determination by tested barometer and thermometer of pressure and temperature, and the calculation of the expansion due thereto. Vapor tension must also be carefully allowed for.

But these difficulties have long ago been removed by the system described in Hinrichs' General Chemistry, Lecture 49 (pp. 228–231).

The essential condition aimed at in devising this method was to complete the chemical work by strictly chemical means exclusively, that is, by the sole use of the balance and the gas burette. Neither thermometer nor barometer is required.

The unit is the milligramme molecule of hydrogen, occupying 24 Cc.; it is produced by the solution of one milligramme atom of pure magnesium (Mg. 24). Hence each milligramme of magnesium produces one Cc. of hydrogen gas, under the standard condition.

This hydrogen standard is practically perfectly reliable, but the conflicting determinations recently made by certain chemists make it desirable to make this work independent of hydrogen. I have therefore made careful determinations on the oxygen standard, obtained by dissolving a weighed amount of pure, crystallized permanganate in peroxide of hydrogen acidified by one-eighth volume concentrated sulphuric acid.

Since two molecules of permanganate produce 5 molecules of oxygen gas (half from each of the permanganate and peroxide) it follows that 316 Mgr. permanganate give 5 times 24 or 120 Cc. of gas under the standard condition of this system. Hence 38 Cc. oxygen gas are yielded per decigramme of permanganate.

The determinations made are given below, they show that the values chemically produced agree exactly with the requirements of the reduction by calculation from temperature and pressure.

For practical work it is best to refer to the cubic centimeter as unit, by simply dividing by 38.

	Physical.			Chemical.			
No.	Bar. Mm.	Temp. Cc.	Vol. of Cc. standard.	Permang. Dgr.	Gas Cc.	Per 1 Dgr.	Vol. of 1 Cc. standard.
1	744	25	1.073	2.168	88.4	40.78	1.073
2	745	24	1.066	2.282	92.55	40.55	1.067
3	745	24	1.066	2.016	81.7	40.52	1.066
4	740	24	1.074	2.144	87.5	40.81	1.074

The results are practically identical to the fourth significant figure, which is all that is required for the best practical work.

The statement of the Pharmacopœia in regard to the gas reductions are unfortunately faulty in regard to the change of the barometer, which defect may cause an error of three per cent. They entirely omit reference to the very great influence of vapor tension. Per contra, they give the expansion due to temperature altogether too fine, namely to the millionth.

This part of the Pharmacopœia of 1900 will, I doubt not, be most carefully revised by the present Committee of Revision.

Oswald Schreiner explained the principal features of the following paper:

SPECIFIC GRAVITIES AND COEFFICIENTS OF EXPANSION OF THE VOLATILE OILS.

BY OSWALD SCHREINER AND W. R. DOWNER.

For a better understanding of the object of the experimental work in this report, it will be necessary to discuss briefly the subject of specific gravity in its relation to the temperature at which it was determined, or at which it was reduced by calculation.

A glance at the tables of the specific gravity of various substances in Landolt and Börnstein's Physikalisch-chemische Tabellen will reveal the fact that the determination of this important constant is in a chaotic condition. That this constant varies with the temperature is well known, and that it ought to be determined at a standard temperature is also universally admitted, yet never followed. Why is this? Simply because there is no convenient standard temperature recognized by chemists and pharmacists.

There are at present three general methods of stating specific gravity, viz:

1. The substance at a stated temperature as compared with water at 4°, and written $\frac{t^\circ}{4^\circ}$, in which t is the temperature at which the determination was made and must always be given.

2. The substance and water both reduced to 0°, and written $\frac{0^\circ}{0^\circ}$.

3. The substance at a stated temperature as compared with water at the same temperature, and written $\frac{t^\circ}{t^\circ}$.

The third method is really the experimental one, the first two results being obtained from this by calculation; for knowing the density of the water at this experimental temperature, the sp. gr. as compared with water at 4° can be readily calculated, and if the coefficient of expansion of the substance is known, this can also be reduced to $\frac{0^\circ}{0^\circ}$, or any other temperature desired.

The question as to which method is the one more commonly employed naturally presents itself. The question can best be answered by looking over the tables of the sp. gr. of the more important organic compounds in Landolt and Börnstein, pp. 163–190. We will find the following:

$\frac{0^\circ}{0^\circ}$	159
$\frac{t^\circ}{4^\circ}$	129
$\frac{t^\circ}{t^\circ}$	260
$\frac{t^\circ}{0^\circ}$	1
$\frac{t^\circ}{4.2^\circ}$	1
$\frac{t^\circ}{15^\circ}$	6
$\frac{t^\circ}{17.5^\circ}$	7

The 260 specific gravities stated as $\frac{t^\circ}{t^\circ}$ are distributed as follows:

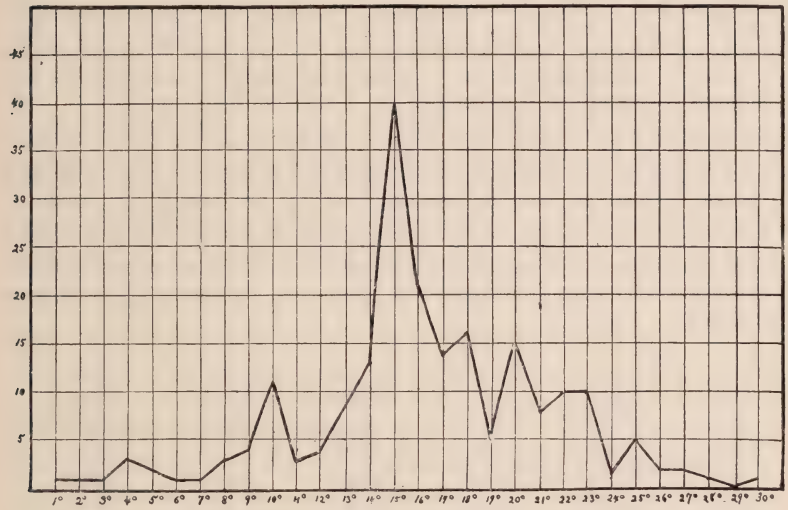
t°		t°		t°	
1	1	13	5	25	5
2	1	14	13	26	2
3	1	15	40	27	2
4	3	16	21	28	1
5	2	17	14	29	0
6	1	18	16	30	1
7	1	19	5		
8	3	20	15		
9	4	21	8	37	1
10	11	22	10	40	1
11	3	23	10	46	1
12	4	24	1	50	1

The last four were determined above 30°, because the substances were solid at a lower temperature. The remaining 47 specific gravities were determined at fractional points on the scale, and with the exception of 17.5, 12.5 and 15.5°, hardly two are alike. In a discussion of these results from the experimental standpoint, the specific gravities stated at $\frac{0^\circ}{0^\circ}$ and $\frac{t^\circ}{4^\circ}$ can hardly be considered. These results were really obtained by reduction from the experimental figures. Of the remaining experimental temperatures by far the greater number of determinations are between the limits of 15 and 23°. This is perhaps better seen from the following curve, which shows the results graphically.

It is evident that the method of stating the sp. gr. as it was obtained from actual experimental figures, without reduction to other conditions, is the method most favored by chemists. Reduction to $\frac{0^\circ}{0^\circ}$ is next in numbers. This reduction is made so as to correspond with the standard of density for gases. Nevertheless a word might be said in favor of the one third in importance, namely $\frac{t^\circ}{4^\circ}$. Much has been said in text-books concerning the identity of the terms density and specific gravity; but as density is the amount of matter in unit of volume, it is evident that we can only speak of specific gravity as density when it has been reduced to

$\frac{t^\circ}{4^\circ}$. As the term density really goes with the metric system, it is evident that this would be the most desirable expression to use, but for many practical reasons the sp. gr. at $\frac{t^\circ}{t^\circ}$ is to be preferred.

While $\frac{t^\circ}{t^\circ}$ is the favorite form of expressing the sp. gr., there is a great diversity of opinion as to the value of t to be used. The United States Pharmacopœia of 1890 adopted the standard $\frac{15^\circ}{15^\circ}$. This was certainly a step in the right direction, but it has not met with the favor expected, due



simply to the reason that the standard is too low for practical work. As a result every experimenter has used the temperature most convenient for him, or has omitted the determination of this constant altogether. The temperature of 15° is at least 5°, and more often 7° to 8°, below the temperature of American laboratories and stores. If the determination is made at room temperature and is reduced by calculation to $\frac{15^\circ}{15^\circ}$ nothing has been gained by making this standard, for it would be far better, if any reduction is to be made, to reduce the result to 4°. Or if the determination is to be made at 15°, the liquids must be cooled down by exposing to the cold weather outside the laboratory in winter, or using cold water or even ice in summer. Finally, when the pycnometer is filled at the proper temperature and brought into the warm air of the room, the liquid expands, runs out of the capillary opening and evaporates. Moreover, if the air is at all moist, water will deposit on the colder pycnometer, and accurate weighing is impossible. It is true that the last two difficulties somewhat compensate each other, but what experimenter would trust such results? These difficulties are recognized by all those who have ever attempted to take the sp. gr. at this temperature. An increase in the standard temperature of the United States Pharmacopœia is absolutely

necessary in order to make it practical. But in overcoming the above-named difficulties by increasing the standard temperature, we meet with a number of other difficulties, which, if the temperature be chosen too high, may entirely annul the advantages gained. Let us briefly consider these difficulties, so that we might be guided in selecting a temperature which shall be high enough to overcome the experimental difficulties, yet not so high as to interfere with the sp. gr. as an accurate physical constant.

1. The volatility of all liquids increases with the temperature. A high temperature will be very troublesome on this account alone, to say nothing of the experimental inaccuracy which must inevitably result. Substances like ether, acetic ether, benzin, bromine, carbon disulphide and amyl nitrite cannot be determined at a temperature above 30°. The tendency of a substance to volatilize increases as the temperature rises and is greatest at its boiling point, providing the liquid is not confined. The vapor tensions at various temperatures give us comparative values of the tendency to volatilize. A comparison, therefore, of the vapor tension of a few liquids and solvents of the United States Pharmacopœia at different temperatures from 15° to 40° will give us a measure of the increase of volatility.

	Water.	Acetic Acid.	Alcohol.	Chloroform.	Ether.
15°	12.67	——	32.60	——	——
20°	17.36	11.73	44.00	160.47	432.78
25°	23.52	——	59.03	——	——
30°	31.51	20.60	78.41	247.51	638.80
35°	41.78	——	——	——	——
40°	54.86	34.77	133.42	369.26	907.04

These few illustrations show conclusively that the volatility is greatly augmented by an increase in temperature. At 37°, a temperature recently recommended for specific gravity work, even water, the least volatile of the solvents of the United States Pharmacopœia, would show an increase of nearly four times its vapor tension at 15°. Alcohol, the next important solvent in United States Pharmacopœia preparations, would show an increase of more than three times its vapor tension at 15°. Chloroform, with its already great volatility, is more than doubled, and the more volatile liquids are entirely out of the question.

2. The solubility of gases decreases with rise in temperature. A sp. gr. determination of the stronger ammonia water at even a moderately high temperature is almost impossible, for in heating it up to this temperature, the greater part of the ammonia is driven off and the resulting sp. gr. does not correspond with the original ammonia, but with the weaker ammonia remaining in the pycnometer. Attention need only be called to the fact that this stronger ammonia water is heated to only 60° in order to drive off the ammonia gas for making the spiritus ammoniæ. The same argument applies to the latter preparation, both alcohol and ammonia escaping

at a higher temperature. Even the 10 per cent. ammonia water would lose a large amount of the gas. The same is true of hydrochloric, sulphurous and nitric acids, spirit of nitrous ether, solution of hydrogen dioxide, etc. The strength of ammonia water and the stronger acids is largely determined by means of the sp. gr. tables, and it is evident that a sp. gr. determination on a sample from which some of the substance has been driven off by heat is worse than useless, it is absolutely wrong.

3. Experimental difficulties. The idea in suggesting this higher temperature was to overcome the experimental difficulties of a cold bath, evaporation from the pycnometer due to expansion of the liquid, and condensation of moisture on the cold pycnometer. The evaporation, we have already seen, is not done away with, and the difficulty of a cold bath has been replaced by the difficulties attending a warm bath. The temperature of the laboratory or store seldom falls below 20° and surely never rises above 25°, except during the hottest summer weather, the average laboratory or store temperature being about 22°. A bath at 15° is only 5 to 7° below the temperature of the room, whereas one at 37° is 15 to 17° above room temperature. The tendency of both these baths is to come to the temperature of the surrounding air. The greater this difference between the room temperature and bath, the more difficult is it to keep the bath constant. In fact, the very difficulty which was to be remedied is only augmented in another direction. The ideal condition would be to have a bath in which to determine the sp. gr. as near as possible to the temperature of the laboratory or store, or at least but slightly above it. This temperature should not be higher than 25°. If the room is colder, it is of course easy to warm the bath up a little, or should the room be warmer than 25° (which occurs but seldom), the bath can readily be regulated by pouring a little colder water into the bath. This colder water is readily obtained even when no ice can be had. Every city druggist is supplied with city water, and even on the hottest days this water is below 25°, being cooled by flowing through the underground pipes. In fact, we have never found it warmer than 22°, even at the end of the summer. Every country druggist has access to a well or spring, the coolness of which is proverbially recognized.

That a temperature higher than 15° is necessary for practical work is generally admitted. The question is then as to what temperature to adopt. This standard temperature ought to be kept as low as is consistent with room temperature. 20° has not given the writers much difficulty and seems to them to be high enough, but if a higher temperature is desired, do not let us go beyond 25°. This has already been incidentally referred to as a convenient standard. Nor do we as pharmacists or pharmaceutical chemists stand alone in this. The physical chemist has already adopted this as his standard for electrical conductivity. This was at first determined at 18°, but the difficulties of keeping a bath constant at this temperature

were soon recognized, and 25° was adopted. All electrical conductivity determinations are now made at 25° all over the world. Every institution where physical-chemical work is done has a bath which can be kept constant at 25°. When the new physical-chemical institute at Leipzig was built a few years ago, a large tank, about 8 to 10 ft. in length and about 2½ ft. deep, was put into the laboratory. This tank is filled with water and kept automatically at 25° from one end of the year to the other. In this bath all constant temperature experiments are performed. In the laboratory here we have a bath of about 50 liters capacity, which is filled with water and kept constant at 25° by means of a stirrer and thermostat. When once started and regulated it requires no further attention. For sp. gr. work the pycnometer is filled with the liquid, the capillary stopper inserted and set into the bath. The liquid will expand slightly and run out of the capillary opening. This is touched now and then with a strip of filter paper, and when no more oozes out, the liquid is at the temperature of the bath and can now be taken out, wiped off and weighed. As the room is usually somewhat cooler, the liquid contracts, and thus all danger of evaporation is done away with. No moisture can condense on the pycnometer, as this is either slightly above, or the same as room temperature. Accurate and rapid weighing is thus made possible.

Attention should be called to another matter of interest in this connection. The Pharmacopœia is a book for the pharmacist and not for the chemist or physicist. No matter what temperature the Pharmacopœia may adopt, the latter will still continue to take his sp. gr. where he pleases and make whatever reductions he thinks necessary. The question is then, has the Pharmacopœia a right to expect an accuracy of the pharmacist (not of the chemist and physicist) which it itself does not uphold? In other words, are we not sometimes given to being what might be called over-accurate? Perhaps the most difficult thing to learn is to know when to be accurate. It is merely waste of time and a great deal of trouble for a pharmacist to weigh off a kilogram of sugar for making syrup on an accurate balance having a capacity of only 100 gr., and thus necessitating 10 weighings. Such accuracy is not upheld by the Pharmacopœia. Perhaps the change in the specific gravity when determined at different temperatures is somewhat overestimated. First of all, why is the sp. gr. at $\frac{15^\circ}{15^\circ}$ different from that at $\frac{20^\circ}{20^\circ}$? If both liquid and water expanded equally, the result would not change, and the sp. gr. at $\frac{15^\circ}{15^\circ}$ would be the same as at $\frac{20^\circ}{20^\circ}$. The change in sp. gr. is therefore due to the unequal expansion of the liquid and the water. In aqueous solutions the expansion is almost, though not quite, the same as that of the water itself, and the sp. gr. is therefore but slightly affected by temperature. In the following table a few sp. gr. have been calculated for different temperatures to show this effect:

	Sugar solution (ab't 43%).	Diff. for each degree.	Glycerin.	Diff. for each degree.	Olive oil.	Diff. for each degree.	Ether.	Diff. for each degree.
4°	1.1955		1.2600		0.9240		0.7360	
15°	1.1874		1.2537		0.9183		0.7196	
19°	1.1849	.0006	1.2520	.0004	0.9162	.0005	0.7141	.0014
20°	1.1843	.0006	1.2515	.0005	0.9158	.0004	0.7128	.0013
21°	1.1838	.0005	1.2511	.0004	0.9152	.0006	0.7115	.0013
22°	1.1832	.0006	1.2508	.0003	0.9148	.0004	0.7102	.0013
23°	1.1826	.0006	1.2504	.0004	0.9144	.0004	0.7088	.0014
24°	1.1821	.6005	1.2500	.0004	0.9139	.0005	0.7075	.0013
25°	1.1815	.0006	1.2497	.0003	6.9135	.0004	0.7063	.0012

In these calculations the following coefficients of expansion were used:

Sugar solution ..... 0.0007030 (Marignac).
Glycerin ..... 0.0005342 (Emo).
Olive oil ..... 0.0007423 (Spring).
Ether ..... 0.00214967 (Pierre).

The result shows that in the case of the sugar solution the difference is but slight, and this is true of most aqueous solutions. With glycerin the result is even more constant. As the Pharmacopœia requires that the sp. gr. of glycerin be not below 1.25, it will be seen that this sample of glycerin would answer to the sp. gr. 1.25, if the results are rounded off to two decimal places, anywhere between 15° and 25°. The changes in the sp. gr. of olive oil are also very slight. The Pharmacopœia gives the limits 0.915 to 0.918. This particular oil would be within these limits anywhere between 15° and 22°. Of the 114 specific gravities of liquids given in the United States Pharmacopœia only about four are accurately stated, about fifty are given within limits from 0.100 to 0.001, and the remaining number is divided up between "about," "not below," "not less than," and "not higher than." In perhaps most of the cases where the limits are given, the limits themselves are far greater than the difference in sp. gr. due to a few degrees in temperature. The olive oil above cited is stated within comparatively narrow limits of sp. gr., and yet this small limit allows a latitude of 7° in temperature. This is one extreme, let us now look at the other.

In the last column of the table ether is considered. Ether has the next to the highest coefficient of expansion of all the liquids mentioned in Landolt and Börnstein, the highest being that of methyl iodide. It would, therefore, show the greatest change in specific gravity with change in temperature of any liquid in the Pharmacopœia. This change is of course too large to be neglected.

In the above table, it will be noticed, the differences in sp. gr. for each degree are constant, at least within the limits of room temperature. It is also evident that, this difference for each degree being known, the sp. gr. at any standard temperature can be calculated with the greatest ease. To

illustrate: The sp. gr. of ether is found at room temperature, which is 22°, both ether and water being at this temperature when weighed. It was found to be 0.7102. The difference for each degree is .0013, as seen from the table. We must, therefore, add $.0013 \times 2 = .0026$ to get the sp. gr. at $\frac{20°}{20°}$. This gives us 0.7128. This is surely a far simpler calculation than the reduction involving the use of the coefficient of expansion and the density of water, both of which are long decimals and involve multiplication and division. Moreover, the coefficients of expansion of by far the larger number of liquids of the United States Pharmacopœia have never been determined, and so a reduction of this kind would be entirely impossible. But this change in sp. gr. for each degree could be readily determined experimentally, once for all. All that would have to be done is to determine the sp. gr. of the liquid at $\frac{15°}{15°}$, $\frac{20°}{20°}$ and $\frac{25°}{25°}$. From the results, subtracting and dividing by 5, the change could be found for each degree between 15° and 20° and between 20° and 25°. These may or may not be alike, depending upon whether the coefficient of expansion of the liquid in question is uniform. This range of temperature would surely include the range of room temperature.

The Pharmacopœia must of course adopt some standard temperature at which to state its specific gravities. Let this be as near as possible to room temperature, say 20 or 25°. It should be neither lower nor higher than these figures. Then let the pharmacist determine his sp. gr. at the temperature of the laboratory or store, be it 19°, 21° or 23°, and then by consulting such a table of differences, determined once for all, make the necessary correction, or if too small, he may omit it altogether. He will know at least, by consulting such a table, whether his sp. gr. is near the true result. Such a proceeding would give results which would in every respect correspond with the accuracy which the Pharmacopœia has a right to expect of the pharmacist or the pharmaceutical chemist in testing pharmacopœial articles. When the sp. gr. is to be determined as an accurate physical constant of a new chemical or pharmaceutical substance, to be used for purposes of reference, the chemist, physical chemist or physicist will of course use the same precautions as to constancy of temperature, etc., as he has always done.

The Pharmacopœia of 1890 gives explicit directions for making volumetric solutions and reagents, and includes directions and remarks on gasometric estimations, alkaloidal assay and the optical rotation of organic substances. It would be well if the United States Pharmacopœia of 1900 were to include under the heading of specific gravity more explicit directions and remarks than was done in 1890, and that there be given under this heading (1) a table of the density and volume of water for each degree from 0 to 35° and for every five degrees from 35 to 100°; (2) a table of the mean coefficients of expansion from 0 to 100° of the more common substances and an illustration showing how to use these tables in

making reductions of sp. gr. to any temperature, and (3) a table giving the change in sp. gr. of the pharmacopœial liquids for each degree between 15–20° and 20–25°, with illustration showing how the table was made and how it is to be used. Neither would a few remarks on the determination of the other constants mentioned in the Pharmacopœia, namely boiling, congealing, and melting-points, be out of place.

In the foregoing the subject of specific gravity in general was discussed and the advisability of adopting a temperature higher than 15° for such work pointed out. A short table was given showing the changes in the specific gravities of a small number of solutions and liquids by a rise in temperature. The advisability of determining the changes in the sp. gr. for each degree, and using this in preference to the coefficient of expansion in reducing to a standard temperature was pointed out. It was also shown that this change is often so small that it might be neglected altogether for many practical purposes. We will now proceed to apply some of these suggestions to a large class of pharmacopœial substances, namely, the volatile oils.

The volatile oils make up a large part of the liquids in the Pharmacopœia, and their specific gravities serve as valuable constituents in determining their purity. It would, therefore, be of interest to study the changes which these oils undergo in specific gravity with change in temperature. This work was undertaken on the suggestion of the sub-committee on the volatile oils for the revision of the United States Pharmacopœia.

In 1885 Lyons* determined the changes in specific gravities with changes in temperature of a small number of volatile oils in connection with a large number of other liquids and solutions. Lyons used a dilatometer, a flask like an ordinary pycnometer, with the stopper extended into a graduated and accurately calibrated tube. By filling the dilatometer up to one of the lower marks and then warming the entire instrument in a bath, the expansion of the liquid can be read off. From this increase in volume the changes in the specific gravity can be calculated. The expansion of the glass vessel itself must be taken into consideration. Lyons' results are given in the following table:

* Proc. Mich. Pharm. Assoc., 1885, p. 203.

I. LYONS' DETERMINATIONS.

Oil.	Sp. gr. 15°.	Difference in sp. gr. for each degree.	
		Apparent.	True.
Anise	0.9816	.000648	.000673
Bay	0.980	812	837
Bitter almond	1.05	949	977
Cubeb	0.9280	723	747
Eucalyptus amyg	0.8704	792	814
" glob	0.9210	792	816
Orange	0.8506	732	754
Pennyroyal	0.9272	655	676
Sassafras	1.0634	1026	1053
Turpentine	0.8790	720	743
Wintergreen	1.1870	965	995

In 1887 Schimmel & Co.* published the results of a large number of sp. gr. determinations made on volatile oils. The specific gravities were taken at 10°, 15°, and 20°. Their results are given in the following table, together with three added columns showing the changes in specific gravity for each degree between the limits 10–15°, 15–20°, and the average change for each degree between 10–20°.

The work of Lyons and Schimmel & Co. appear to be the only systematic attempts at determining the changes in specific gravity of the volatile oils by heat. Inasmuch as these determinations were made nearly fifteen years ago, and therefore on the whole may have differed more or less from the oils now found in the market, it was thought to be advisable to determine the specific gravities of a number of the volatile oils of the present market at different temperatures. Moreover, the determinations were made to the fourth decimal place, whereas those of Schimmel & Co., are only given to the third. For all practical purposes of tests for purity, etc., third decimal place is accurate enough, but for the accurate determination of the specific gravity, as a physical constant, and for the calculation of the coefficient of expansion, the determination of the fourth decimal place was thought not only desirable, but necessary.

A total of sixty-one samples, comprislng thirty-two oils, were used for the determinations. These oils were donated to the Sub-committee on Volatile Oils of the U. S. P. Revision Committee by Fritzsche Bros., Dodge & Olcott, and Sharp & Dohme, for this purpose.

Three specific gravities for each sample were taken, one at 15°, one at 20°, and one at 25°. The pycnometer used was Oswald's modification of the Sprengel tube, the ends being protected by glass caps. The tubes

* Schimmel & Co., Berichte, Apr., 1887, p. 45.

weighed about 25 gr., and had a capacity of about 25 Cc. The tubes were filled by suction, and in the case of viscid oils a water pump was used. The oil was cooled below 15° before putting into the pycnometers.

II. DETERMINATIONS BY SCHIMMEL & CO.

Oil of Preparation.	Specific Gravity.			Change for each degree between		Average change for each degree between 10–20°
	10°	15°	20°	10–15°	15–20°	
Angelica root	0.860	0.858	0.853	0.0004	0.0010	0.0007
Anise	——	0.985	0.980	——	10	——
Bergamot, 1a Reggio	0.887	0.883	0.880	8	6	7
Bitter almond	1.063	1.060	1.055	6	10	8
Cajuput (green)	0.927	0.925	0.922	4	6	5
Calamus	0.961	0.950	0.957	4	4	4
Caraway, twice rectif. from Wis. seed.	0.905	0.900	0.896	10	8	9
Caraway, twice rectif. from Dutch seed	0.911	0.908	0.905	6	6	6
Cardamom (Ceylon)	0.962	0.900	0.897	4	6	5
Carvone	0.967	0.963	0.958	8	10	9
Cassia ("Zimmtblüthen")	1.073	1.068	1.063	10	10	10
Cassia (rect.)	1.058	1.055	1.052	6	6	6
Cedarwood	0.948	0.945	0.940	6	10	8
Cinnamon, Ceylon	1.035	1.030	1.027	10	6	8
Citronella (E. Ind. Melissa)	0.900	0.896	0.893	8	6	7
Cloves	1.065	1.062	1.059	6	6	6
Cloves, stems	1.065	1.061	1.057	8	8	8
Coriander	0.872	0.867	0.864	10	6	8
Cubebs	0.918	0.915	0.912	6	6	6
Cumin	0.925	0.922	0.918	6	8	7
Dill	0.905	0.900	0.896	10	8	9
Eucalyptol purum album	0.935	0.931	0.928	8	6	7
Eucalyptol (globul.)	0.925	0.922	0.918	6	8	7
Fennel, I. fr. seed, rect	0.975	0.970	0.965	10	10	10
Ginger	0.885	0.882	0.878	6	8	7
Juniper (twice rect.)	0.863	0.858	0.855	10	6	8
Lemon	0.856	0.854	0.851	4	6	5
Mace	0.858	0.855	0.852	6	6	6
Mustard (genuine ess.)	1.030	1.025	1.020	10	10	10
Mustard (artificial)	1.025	1.020	1.016	10	8	9
Orange, sweet	0.854	0.850	——	8	——	——
Peppermint, F. S. & Co.	0.906	0.903	0.901	6	4	5
Peppermint, Mitcham	0.905	0.900	0.898	10	4	7
Saffrol	1.109	1.104	1.100	10	8	9
Sandalwood (superf. E. Ind.)	0.978	0.975	0.973	6	4	5
Sassafras	1.068	1.065	1.060	6	10	8
Spearmint, Germ. rect.	0.930	0.925	0.922	10	6	8
Star anise	0.990	0.985	0.980	10	10	10
Valerian	0.947	0.945	0.940	4	10	7
Wintergreen (natural)	1.189	1.185	1.182	8	6	7
Wintergreen (artificial)	1.192	1.187	1.183	10	8	9

The filled pycnometer was then immersed, all but the tips of the tubes, in a bath kept constant at 15°. As the liquid warmed up it expanded slightly and oozed out at the tips. This was absorbed with filter paper, and when no more oozed out, the caps were put on and the pycnometer removed from

the bath, carefully wiped and weighed. Aftet weighing the caps were again removed and the tube immersed in a bath kept constant at 20°. When the expansion had ceased, the caps were again put on, wiped and weighed as before. Finally it was put into a bath at 25° and treated as before. For the sake of economy in time, five different pycnometers were used at the same time.

The weight of distilled water which the pycnometer holds at the same temperatures had been previously determined. By dividing the weight of the oil by the weight of the water at the same temperature, the specific gravity of the oil was obtained. The specific gravities given for any temperature are therefore always those compared with water at the *same* temperature.

The apparatus for keeping the desired temperatures consisted of three large tanks of about fifty liters capacity each, and a smaller one for ice water. One of these was used for the 25° bath and kept constant by means of a small gas flame connected with a thermostat. The second tank was used as the 15° bath, and could be supplied from a smaller tank placed above it, with ice water. The third tank served as the 20° bath, and being placed somewhat lower than the 15° and 25° baths, it could be supplied with cooler or warmer water from these as desired. All four vessels were connected with each other by means of siphons supplied with stop-cocks. The tanks had faucets connected with the sink, so that the water could be drawn off in case the bath got too full. Each tank was provided with a stirrer, which was automatically rotated by means of a water motor. The 15° and 20° baths would remain constant for at least 45 minutes, after which they required a little addition of cold water. The 25° bath could, of course, be kept constant for hours or days without any attention when the thermostat was once regulated. As a practical point, it might also be mentioned in this connection that in making this large number of determinations, the ease with which the determinations at 25° were made in comparison with those made at the lower temperatures, especially at 15°, was quite striking. During the warmer summer weather the determinations at 15° were, to say the least, quite troublesome, especially on moist days.

In table III. the results of the determinations are given. In the first column is the name of the oil. The oils have been arranged alphabetically, and numbered successively. The letters *a*, *b* and *c* indicate the samples obtained from the firms mentioned. In each case the name and commercial variety is given as it appears on the label. In the second, third and fourth columns the specific gravity as compared with water at that same temperature is given. In the fifth and sixth columns the change in specific gravity for each degree between 15–20° and 20–25° respectively is given. In the last column will be found the average change of all the samples per degree between 15–25°.

III. TABLE OF CHANGES IN SP. GR. WITH CHANGES IN TEMPERATURE.

Oil.	Specific Gravity.			Change in sp. gr. for each degree between		Average change for each degree between 15–25°
	15°	20°	25°	15–20°	20–25°	
1 *a*. Bay, "Our own distillation"	0.9685	0.9651	0.9616	0.00068	0.00070	0.00067
b. "	0.9706	0.9673	0.9640	66	66	
2 *a*. Bergamot, F. B, handpressed	0.8819	0.8794	0.8760	50	68	67
b. " Sanderson's	0.8828	0.8791	0.8753	74	76	
3 *a*. Bitter almond, genuine	1.0567	1.0532	1.0498	70	68	69
b. " " poison	1.0604	1.0575	1.0546	58	58	
4 *a*. Cade	0.9329	0.9304	0.9278	50	52	49
b. " imported	0.9154	0.9135	0.9108	40	54	
5 *a*. Cajuput	0.9231	0.9199	0.9163	64	72	68
b. "	0.9222	0.9187	0.9152	70	68	
6 *a*. Caraway, Dutch, twice rect.	0.9129	0.9100	0.9076	58	48	58
b. " D. & O.	0.9117	0.9087	0.9055	60	64	
7 *a*. Cassia	1.0634	1.0610	1.0578	48	64	63
b. " native	1.0671	1.0640	1.0608	62	64	
b'. " selected	1.0617	1.0583	1.0546	68	74	
8 *a*. Cinnamon, Ceylon	1.0434	1.0402	1.0364	64	76	67
b. " heavy, Ceylon	1.0471	1.0445	1.0408	52	74	
9 *b*. Cinnamon leaf	1.0544	1.0513	1.0475	62	78	70
10 *a*. Cloves	1.0488	1.0458	1.0425	60	66	63
b. " Buds	1.0510	1.0479	1.0444	62	70	
11 *b*. Copaiva	0.9146	0.9122	0.9096	48	52	50
12 *a*. Coriander, genuine	0.8743	0.8709	0.8669	68	80	73
b. " D. & O.	0.8716	0.8679	0.8644	74	70	
13 *a*. Cubebs	0.9284	0.9257	0.9229	54	56	57
b. "	0.9208	0.9179	0.9149	58	60	
e. "	0.9246	0.9218	0.9189	56	58	
14 *a*. Erigeron, pure	0.8698	0.8669	0.8637	58	64	60
b. "	0.8686	0.8658	0.8627	56	62	
15 *a*. Eucalyptus globulus	0.9185	0.9153	0.9110	64	86	74
b. " Australian (About 70 per cent. eucalyptol.)	0.9200	0.9163	0.9127	74	72	
16 *b*. Fennel	0.9820	0.9787	0.9748	66	78	72
17 *a*. Lemon, F. B., handpressed	0.8582	0.8557	0.8521	50	72	62
b. " Sanderson's	0.8581	0.8549	0.8518	64	62	
18 *a*. Nutmeg	0.8922	0.8888	0.8855	68	66	66
b. "	0.9045	0.9014	0.8980	62	68	
19 *a*. Orange, F. B., sweet, handpressed	0.8504	0.8474	0.8433	60	82	63
b. " sweet, Sanderson's	0.8495	0.8467	0.8440	56	54	
20 *a*. Pennroyal	0.9283	0.9251	0.9221	64	60	65
b. "	0.9335	0.9302	0.9267	66	68	
21 *a*. Peppermint, Wayne Co.	0.9123	0.9097	0.9068	52	58	60
b. " finest	0.9112	0.9079	0.9048	66	62	
22 *a*. Pimenta	1.0376	1.0341	1.0299	70	84	68
b. " berries	1.0438	1.0406	1.0378	64	56	
23 *a*. Rosemary, French	0.9058	0.9029	0.8998	58	62	60
24 *b*. " flowers	0.9054	0.9021	0.8988	68	66	67
25 *b*. Santalwood	0.9764	0.9736	0.9711	56	50	53
c. "	0.9763	0.9737	0.9711	52	52	
26 *a*. Sassafras, natural	1.0802	1.0774	1.0740	56	68	63
b. "	1.0722	1.0686	1.0659	72	54	
27 *a*. Savin, German	0.9174	0.9137	0.9105	74	64	67
e. "	0.9710	0.9672	0.9644	76	56	
28 *a*. Spearmint	0.9321	0.9292	0.9255	58	74	68
b. "	0.9337	0.9301	0.9266	72	70	
29 *a*. Anise, stellated	0.9842	0.9811	0.9778	62	66	62
b. " seed. Star	0.9798	0.9764	0.9738	68	52	
30 *a*. Thyme, white, French	0.8957	0.8931	0.8899	52	64	63
b. " white	0.9037	0.9003	0.8970	68	66	
31 *a*. Wintergreen (sweet birch)	1.1881	1.1847	1.1804	68	86	82
b. " finest	1.1890	1.1849	1.1802	82	94	
32 *a*. Wormseed	0.9604	0.9588	0.9540	32	96	64
b. " Baltimore	0.9695	0.9664	0.9632	62	64	

An examination of the last three columns shows that the change in specific gravity of the volatile oils for each degree is comparatively small, and nearly uniform between the limits 15° and 25° for any oil. Moreover, the last column shows that this change is not very different for dif-

ferent oils. The average of all the figures in the last column is 0.00064. The only two oils which differ to any great extent from this figure are the oils of cade and wintergreen. Both these oils are, as is well known, quite different from the other volatile oils. Even with these extremes the difference obtained by using the experimental factor or the average factor 0.00064 is slight within a limit of ten degrees. These results are given in the following:

Sp. gr. observed at 25°.	Sp. gr. reduced to 15°.	
	Using exp. factor.	Using aver. factor.
Cade 0.9278	0.9327	0.9342
Wintergreen.....1.1802	1.1884	1.1866

When the results are rounded off to three decimal places (as given by the U. S. P.) the difference amounts to only one unit in the third decimal place. Now when we consider that the Pharmacopœia allows the sp. gr. of wintergreen oil to vary between the limits 1.175—1.185 with a difference of 0.010, and cade oil is to be "about .990," the above slight variation is certainly not worth quarreling over for the practical purposes of the pharmacist and manufacturer. If this difference is comparatively small in the case of these extremes, it must be evident that in the case of the other oils it may be entirely neglected and all corrections made with the average change 0.00064 for all the oils examined. This would considerably simplify matters. For instance, the sp. gr. of lemon oil is found to be 0.853 at 23°, the water being also at this temperature. It is desired to know its sp. gr. at 15°. The factor 0.00064 is multiplied by the differences between the temperatures 15 and 23°, or 8, and this result is added to the sp. gr. found at 23°. The result is $0.853 + 0.00512 = 0.858$, the last two decimal places being dropped. The result will be the sp. gr. at 15° compared with water at 15°. The calculation is exceedingly simple, being in marked contrast with the laborious calculation necessary when the coefficient of expansion is used.

It was thought to be of interest to use the experimental data obtained in determining the specific gravities above given for calculating the coefficients of expansion of the volatile oils. The limit of ten degrees is rather small for such work, but the results are given as being as accurate as might be expected with the method employed and the limits of temperature taken.

The formula used in making the calculations was as follows:*

$$a = 3\left(\frac{p}{p'} + \frac{p-p'}{p'(t'-t)}\right)$$

where p and p′ represent the weights of the oil contained in the pycnome-

* Kohlrausch, Prakt. Phys., VII., p. 97.

ter at the temperature t and the higher temperature t'; 3β is the coefficient of cubical expansion of glass and was taken as 0.000026.

The results of the calculations are given in table IV. The first column contains the name of the oil, the second and third marked *a* and *b* correspond with the oils marked similarly in table III. The last column gives the average of both samples, whenever the results were considered close enough. Where this was not the case a question mark occurs in the last column. Whether this is due to an error in the determination or to a difference in the composition of the two oils cannot at present be stated. To decide this question further work with these oils is contemplated.

IV. TABLE OF COEFFICIENTS OF EXPANSION BETWEEN 15 AND 25°.

Oil.	*a*	*b*	Average.
Bay	.000918	.000914	.000916
Bergamot	912	975	944
Bitter almond	855	774	?
Cade	733	746	740
Cajuput	964	974	969
Caraway	775	938	?
Cassia	775	813	794
Cinnamon	805	851	828
Cinnamon leaf	—	864	—
Cloves	843	824	834
Copaiva	—	788	—
Coriander	976	992	984
Cubebs	802	840	821
Erigeron	930	875	903
Eucalyptus	952	1002	977
Fennel	—	875	—
Lemon	947	966	957
Nutmeg	949	968	959
Orange, sweet	968	901	935
Pennyroyal	858	860	859
Peppermint	826	909	?
Pimenta	872	789	?
Rosemary	879	—	—
Rosemary flowers	—	974	—
Sandalwood	—	737	—
Sassafras	805	809	807
Savin	973	—	—
Spearmint	841	892	867
Star anise	859	830	845
Thyme	857	961	?
Wintergreen	894	850	872
Wormseed	885	882	883

Laboratory of Pharmaceutical Technique, University of Wisconsin.

THE CHAIRMAN: It seems to me that the reference of this paper to the Pharmacopœial Committee would be proper.

Mr. Ryan moved to so refer and the motion was adopted.

The next paper was one by F. W. E. Stedem, as follows:

NOTE ON THE APPLICATION OF THE COLD NITRIC ACID TEST FOR ALBUMEN.

BY F. W. E. STEDEM.

Dr. Napoleon Boston, of Philadelphia, recommended, some time ago, the use of a glass tube in applying the cold nitric acid test for albumen, usually known as Heller's test. It consists of simply allowing a little urine to flow into a glass tube of small calibre by capillary attraction and washing off the outside of the tube with water, and then immersing the same (holding the finger on the tube to prevent the escape of the urine) into a test tube of nitric acid. Remove the thumb or finger very carefully from the tube, allowing the gradual ingress of the nitric acid from the bottom. The greater density of acid forces the urine slowly up the tube, and the point of contact is distinctly marked in the presence of albumen by a slight but always distinct layer of coagulated albumen.

I have found this method very useful and very economical, because of the exceedingly small amount of acid required for the application of the test, and because it is expeditious.

In connection with this subject it might possibly be well to call particular attention to the necessity on the part of the examiner to determine by inquiry from the physician before making the test, as to whether the patient had been given any of the ordinary synthetic remedies of the day, principally the aniline derivatives. It has been found that the administration of many of these substances is speedily followed by certain conditions in the urine which make it almost impossible to depend entirely upon the accepted tests, particularly of the tests usually applied to determine the presence or absence of sugar. Of course in the hands of a person accustomed to doing the work, very little difficulty is experienced.

Mr. Kebler made a short abstract and explanation of the following paper:

THE CHEMICAL COMPOSITION OF CALCIUM LACTOPHOSPHATE.

BY LYMAN F. KEBLER.

The nature of the chemical composition of this compound has probably caused considerable speculation, especially in that there are such marked differences in physical appearance and solubilities. Literature is almost silent about this substance. We are told that it is a white, hard, shining, scaly crystal; yet it is safe to say that no one ever saw calcium lactophosphate in this form on the market. The writer, furthermore, is of the opinion that the crystals above described were microscopic in form, and in all probability were calcium lactate rather than calcium lactophosphate.

Thos. S. Barrie* in 1900 made a report on the quality of "Commercial Lactophosphate," and as the writer's observations differ quite materially from those recorded by Mr. Barrie, it was thought desirable to present them here. The latter describes the article as "Lumpy masses, somewhat resembling a very coarse effervescent citrate, very acid, hygroscopic, and dissolves partially in water, leaving a more or less abundant residue." The above description portrays very well the appearance and condition of the poorer available material, but the better quality usually comes as dry, non-hygroscopic, white shavings or chips, more or less broken, about an eighth of an inch thick; quite sour to the taste, and almost completely soluble in water. What appears to be a considerable amount of insoluble matter turns out to be very small when weighed.

A qualitative analysis showed that the available material was not a chemical compound, but a mixture consisting of calcium phosphate, calcium lactate and lactic acid. Varying proportions of the above chemicals were then mixed and variously treated; but it appeared to be impossible to so mix them as to produce a clear solution unless the acidity was unduly great.

A sample was next examined quantitatively. The total free acid was estimated by titration with normal potassium hydroxide, using phenolphth lein as indicator, and calculated as lactic acid. The free lactic acid was then estimated by treating the finely powdered material with strong ether, which removes the lactic acid and leaves the remaining ingredients intact. On evaporating the ethereal solution to constant weight, in a tared capsule, the per cent. of lactic acid can readily be calculated. The amount thus obtained was checked by drying the residue left from the ether treated powdered calcium lactophosphate, to constant weight at 60 degrees C. The amounts thus obtained in both cases accorded very nicely. It was found, however, that the per cent. of acid indicated by titration exceeded the amount of lactic acid removed by the ether. It was also observed that the residue insoluble in ether was acid in reaction, and quite as soluble in water as the original calcium lactophosphate, which would indicate that the lactic acid does not exert much influence on the solubility of the calcium lactophosphate, as has been claimed. An explanation for the solubility of this compound must therefore be sought for elsewhere.

From the above results the natural inference would be that the calcium is present, in part at least, as an acid phosphate. The composition of calcium lactophosphate would then become calcium acid phosphate, calcium phosphate, calcium lactate and lactic acid. On the above composition the following are based:

* 1900 Pharm. Jour,. 228.

CALCIUM LACTOPHOSPHATE.

Number.	Physical Appearance.	% Insoluble in H_2O.	% of Moisture at 100° C.	Moisture at 114° C.	% of Total Free Acid calculated as lactic.	% of Free Lactic.	% of Calcium Acid Phosphate.	% of Phosphorus.	% of Calcium Phosphate.	% of Anhydrous Calcium Lactate by difference.
1. Cryst. Sol. .	Scales.	0.72	19.00	20.2	9.90	6.66	3.16	2.11	6.36	63.62
2. Soluble....	Gran.	3.00	8.8	18.	44.10	31.5	12.28	5.65	12.	26.22
3.	Scales.	0.56	14.4	16.2	9.00	8.82	0.18	0.80	3.77	71.03
4.	Scales.	Unweighable.	16.2	29.0	33.84	27.8	5.89	2.56	5.00	32.31

When microscopically examined all samples indicated a crystalline appearance. The methods for estimating the lactic acid have been described above. The calcium acid phosphate was calculated from the amount of normal alkali consumed in excess of that required for the lactic acid, as determined by the ether extraction method. The calculations are based upon the following equation:

$$3Ca(H_2PO_4)_2 + 8KOH = Ca_3(PO_4)_2 + 4K_2HPO_4 + 8H_2O.$$

The per cent. of phosphorus was estimated by means of the ammonium molybdate and ammonium magnesium phosphate method. After deducting the amount of phosphorus required for the calcium acid phosphate, as calculated above, the remaining phosphorus was calculated as normal calcium phosphate. The calcium lactate was estimated by difference. The moisture was determined in a hot-air oven. The results obtained in a desiccator of sulphuric acid were so anomalous that a record of them would be useless. The substance insoluble in water was found to be calcium phosphate.

A paper by Mr. Kebler on "Meat Extracts" was read by title only, at request of the author.

EXTRACT OF MEAT.

BY LYMAN F. KEBLER.

Extract of Meat contains more or less of the meat bases and saline bodies usually found in muscular tissues; such as creatin, creatinin, xanthin, hypoxanthin, cernin, tyrosin, leucin; also, phosphocarnic acid, inosinic acid, from 4 to 5 per cent. of hemi-albumoses, traces of peptones, etc.; and sodium chloride, potassium chloride, potassium phosphate, mag-

nesium phosphate, sodium sulphate, calcium sulphate and some form of iron. Muscles usually contain from 10 to 15 per cent. of mineral matter, calculated on the moist basis. The predominating salt is potassium phosphate.

Some of these constituents are compounds which represent stages of the breaking down of higher into lower bodies. They must therefore be considered as substances which have their origin in the metabolic transformation of animal tissues, which are consumed in the activities of life, and ultimately result in waste products.

Extracts of meat are undoubtedly useful in their way, but the nature of their composition does not by any means justify the extravagant claims made for many of them. They undoubtedly possess stimulating and restorative properties, and like tea and coffee, are useful food adjuncts rather than true foods. Their substitution for the true foods in cases of sickness or debility is liable to result in deplorable consequences.

Most of us have undoubtedly been led to think that Liebig was the originator of this commodity; yet extract of meat was first described by Proust, in 1801—a number of years before Liebig's time. Liebig was, however, instrumental in making it a recognized commercial article, as early as 1856.

According to Liebig"s directions, 34 pounds of lean beef are required to make one pound of extract. This fact alone shows how completely the nutritive portion of the meat, such as albumen, gelatin and fat are excluded, and practically nothing but the saline principles and extractive matters of the meat are removed.

Modern mechanical improvements and chemical investigations have made it possible to render meat fibres almost completely soluble. That such improvements are being utilized by the manufacturers is well illustrated by patent No. 10,961 taken out in England in 1890. According to this patent, the meat is chopped and mashed, mixed with about half its weight of water, heated by steam under pressure for about one hour between 150° and 175° C., which renders a portion of the albuminous matter soluble. This partially digested mass is then submitted to pressure to remove the extractive. The pressed residue is then mixed with an equal weight of concentrated hydrochloric acid and digested on the water bath until the fibro-muscular tissue is quite disintegrated. The mixture is then submitted to filtration, the acid neutralized with sodium carbonate and the resulting liquor mixed with the steam treated extractive, and the whole evaporated, in a vacumm pan, to the desired concentration.

From the above information it can readily be seen how it is possible for the manufacturer to supply almost any quality of the meat extract called for—he being guided solely by the price the purchaser is willing to pay. This condition of affairs was brought to the writer's attention by the analyses he made of a number of samples of extract of meat, varying in price

from the most expensive to what he believes the most reasonable. The analytical results, the aroma, etc., were frequently quite at variance with the prices asked. In fact, there appears to be very little difference between some of the most expensive and some of the more reasonable, as can be seen by comparing numbers 1 and 8 of the table below, point by point

The analytical methods employed in making the analyses of the extracts of meat enclosed in this paper, are embodied in the scheme of Stutzer. Notwithstanding the comprehensiveness of this scheme, the methods are in many cases far from satisfactory. For example, the amount of material soluble in 80 per cent. alcohol is one of the factors to be considered in finally deciding on the value of an extract of meat. It so happens that common salt is soluble in 80 per cent. alcohol, consequently the more salt present the more valuable will be a given extract, judged by the results obtained by such a method. Its uselessness is readily seen.

It is also frequently difficult for the same operator to obtain concordant results with some of these methods when applied to the same sample. In addition to the above it is well known that these preparations made by the same firm at different dates are liable to vary considerably in character. From this can readily be seen that all analytical results are only relative, and in order to be of any value the methods of analyses must be given.

The chlorine was all calculated as sodium chloride; but it is well known that the predominating chloride in the muscle is potassium, and the large quantity of chloride indicated is due to added material.

In all calculations for nitrogenous matter the factor 6.25 was employed. It is well known that this is not strictly correct, but it probably approximates the truth more nearly than any other factor; and the results obtained can readily be compared with those of other workers.

The results in the following table explain themselves.

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* 1895, Ztsch. Anal. Chem., 34, 372; Abst. Jour. Soc. Chem. Ind., 14, 897; Analyst, 20, 248.

Number.	Moisture.	Total solids.	Ash.	Sodium chloride.	Aroma or odor.	Color.	Consistence.	Taste.	Amount soluble in water.	Per cent. of nitrogen.	Per cent. soluble in 80 per cent. alcohol.	Petroleum ether extract.	Gelatin.	Albumin.	Coagulable albumin.	Peptones.	Meat bases.	Phosphoric acid.	Albumoses.
1	21.96	78.04	21.21	6.64	Good.	Uniformly brown.	Firm.	Agreeable, pleasant, salty.	All concentrated and dilute solutions are turbid, unweighable amount removed by filtration.	7.83	58.60	0.35	3.76	Trace.	Trace.	5.23	37.22	4.50	2.73
2	19.32	80.68	20.87	5.21	Good.	Brown except dark layer on top.	Firm.	Agreeable, pleasant, salty.		9.22	63.73	0.23	4.25	Trace.	2.16	9.76	38.30	4.86	3.16
3	22.55	77.45	33.03	17.49	Poor.	Nearly black.	Quite soft.	Very salty.		5.06	59.76	0.18	5.63	1.06	1.86	7.93	14.15	2.67	1.06
4	18.68	81.32	28.25	15.46	Fair.	Darker brown.	Firm.	Pleasant salty.		8.05	62.50	0.37	3.15	0.73	1.37	4.93	37.73	2.42	3.45
5	19.06	80.94	29.51	13.49	Poor.	Darker brown.	Firm.	Slight caramel odor.		7.41	61.00	0.41	4.00	Trace.	Trace.	6.78	33.51	4.37	2.08
6	21.98	78.02	25.36	8.54	Fair.	Uniformly dark brown.	Very firm.	Pleasant.		8.17	52.73	0.52	3.79	0.41	1.02	3.41	39.46	2.46	3.00
7	18.3	81.64	31.32	17.09	Good.	Uniformly darker brown.	Firm.	Pleasant salty.		8 43	61.50	0.19	4.53	Trace.	2.00	6.54	37.35	3.18	2.31
8	17.12	82.88	26.71	10.11	Good.	Uniformly brown.	Firm.	Pleasant salty.		8.39	66.50	0.43	4.37	Trace.	0.71	8.27	35.47	3.76	3.62

The Chairman here announced that Professor Edward Kremers of the University of Wisconsin is engaged in investigations concerning the quinhydrones as plant pigments, and had consented to make at this meeting an oral preliminary report upon the subject, the completed paper to be presented at the next meeting. Professor Kremers, however, was not present at this session, so that the preliminary report referred to was not made.

Mr. Kebler presented in abstract the following paper upon "Adulterated Drugs:"

THE ADULTERATION OF DRUGS.

BY LYMAN F. KEBLER.

Many of the reports bearing upon the adulteration of food products and medical preparations, which come to hand from time to time, are of such character that at the time of reading we are almost overawed by the number of sophisticated or adulterated articles reported. Tables are presented which would indicate that from 50 to 75 per cent. of the articles examined are adulterated or spurious. It this is really a correct representation of the facts as they exist, we would be compelled to admit that this country must be a veritable happy hunting ground for the manipulator. But, upon closer examination, it will be found that these reports are "reports of adulterations" in the full sense of the word, and that, when a man starts out to find adulterations he is usually successful. Taking the whole field into consideration, the author does not believe that these reports present the actual existing condition of affairs.

In the course of some of my notes to the Pharmaceutical Era it was stated, in substance, that while the number of adulterated articles reported is found to be comparatively large, the proportion of intentional adulterations actually met with do not exceed 5 per cent. Indeed, extended experience in examining the vast number of articles that come up for investigation in the actual course of business, shows that the adulterations practiced are actually very much less than this. Such a statement may seem somewhat radical, but it is based upon the results obtained in the Chemical Laboratory of Smith, Kline & French Co., Philadelphia, Pa., which firm submits to a strict examination nearly all the products they handle.

The subject of the adulteration of foods and drugs is a well-worn theme. Many able reports have been presented time and again, and the writer believes that such reports have had much to do by way of educating both the druggist and the public, and that adulteration has become minimized more largely as the result of these educational efforts than through legislation. The object of this report is precisely along the former line. It is intended to be educational.

The articles referred to are shown in the exhibit given in connection with this meeting. Specimens are here for the careful examination of all the members, and full information concerning them will be cheerfully

given. It is hoped that all who have the opportunity of doing so will examine them and that they will in this way, and through what may be said herewith, be better equipped to detect adulterations of articles that may come to them in the regular course of business. The adulterations herewith described are typical in character of what may be expected to be met with, and more than that it is not deemed necessary to give.

For convenience of reference the articles described are divided into chemicals, oils, simple drugs, and allied products.

CHEMICALS.

The first subject to be considered is chemicals.

Ammonium Acetate is quite a difficult chemical to make, especially in warm weather, being very prone to liquefy and even to dissociate. This probably accounts for the fact that an article is frequently supplied which is freely soluble in water and alcohol, having a mousy odor, a melting-point of 82° C., and a boiling-point of 222° C. These are the physical properties of acetamide, and acetamide it was. It seems to be the custom of certain manufacturers to deliver this article when ammonium acetate is asked for. No manufacturer is justified, at any time, either for convenience or otherwise, to deliver one article for another, even though they resemble each other very closely, both chemically and physically. But in view of the fact that the physiological uses of ammonium acetate are well known, and those of acetamide are as yet obscure, such a substitution must be considered high-handed.

Calcium Phosphate, Precipitated.—An article of fine physical appearance proved upon examination to contain thirty per cent. of calcium carbonate. The presence of this impurity is not incidental to the manufacture of calcium phosphate, as some one has intimated. Any one using such phosphate of calcium for the purpose of diluting powdered opium in manufacturing laudanum, would have no end of trouble before the product is finished.

"*Chromic Acid.*"—Quite a number of grades of "chromic acid" are regularly supplied by manufacturers, and unless great care is exercised the purchaser will find himself in possession of an article containing about forty per cent. of "chromic acid" and sixty per cent. of sodium acid sulphate. This product is manufactured by mixing molecular proportions of sodium dichromate, dissolved in a suitable quantity of water, and sulphuric acid, according to the following equation:

$$Na_2Cr_2O_7.2H_2O + 2H_2SO_4 = 2CrO_3 + 2NaHSO_4 + 3H_2O.$$

The mixture is then simply dried and the product resulting placed on the market as "chromic acid." There is considerable variation in the physical appearance in the best grades of chromic acid and it is easy to be deceived. The only safe plan is to estimate the actual content of chromic acid. A short, rapid method has been worked out by the writer and will be found in the Amer. Jour. Pharm., 1901, page 395. The

presence of sodium is readily established by the sodium flame test, and the sulphate by means of barium chloride.

Soluble Blue.—Ultramarine blue has been supplied when soluble blue was called for, and a great contention was raised when an unfavorable report was submitted. This product is soluble in water, but care must be taken not to be deceived, inasmuch as the ultramarine blue is a very fine powder and remains suspended in the water for some time. It is best to make up the solution or mixture and let it stand for twenty-four hours, and if the product is ultramarine, the blue will subside and leave the upper aqueous layer perfectly colorless, while a soluble blue under the same conditions will leave a permanent blue solution.

Podophyllin, Powdered.—When a request was made that a sample of this material be submitted, it was found upon examination to consist of powdered mandrake root. This fraud is easy established by its insolubility in alcohol and microscopic appearance.

Tannic Acid, Commercial.—For this article powdered Chinese nutgalls have been supplied. Any one familiar with the odor of these galls can readily detect this substitution. Commercial tannic acid, furthermore, is nearly soluble in water, whereas powdered Chinese nutgalls leave considerable insoluble matter. The microscope can be used to advantage with such a product.

Coumarin.—A sample of this article was submitted for examination and proved to be of very good quality. Accordingly, a good-sized order was placed, and when the goods arrived another examination showed the material to possess a melting point from 54½° C. to 57° C., while the melting point of pure coumarin is 67° C. On heating with a 5 per cent. solution of potassium hydrate at a temperature of about 60° C. for an hour the odor of aniline was developed, and the addition of a solution of calcium hypochlorite to this mixture gave the blue color reaction characteristic of aniline. On applying Hofmann's reaction for primary amines, the characteristic and disagreeable odor of phenylcarbylamine was obtained, indicating the presence of a primary amine. The percentage of nitrogen was estimated, and on calculating the nitrogen back as acetanilid it was found to amount to 26 per cent.

Vanillin.—With this article the same difficulty was experienced mentioned above in connection with coumarin; namely, the sample submitted was of excellent quality, while the consignment of goods ordered from this sample proved to be a substitution. This contract involved several thousand dollars, and at first considerable difficulty was anticipated in getting rid of this substance, which proved upon examination to consist of broken crystals of acetyl iso-eugenol, the direct antecedent of vanillin in the manufacture of the synthetic product. The manufacturer, however, took back the goods without a murmur and paid all expenses involved, including the cost of analysis. The interesting point in this connection is

that the melting point of acetyl iso-eugenol is 78° C., while pure vanillin melts at from 80° to 82° C. From this it can be readily seen that had only a superficial examination been made of the goods consigned, they would readily have passed as vanillin, inasmuch as the acetyl iso-eugenol had been mixed with a certain proportion of vanillin to give it a distinct vanillin odor. The following methods were employed to establish this impurity: microscopically the crystals were abnormal; with concentrated sulphuric acid a beautiful red color was developed, whereas vanillin gives a lemon-yellow with this reagent; by estimating the per cent. of vanillin according to the method of Prescott and Hess, modified by the writer and found in the American Druggist, March 10, 1899. The solubility was also abnormal, and the presence of acetic acid was established by the conventional methods.

Another sample of vanillin submitted contained 90 per cent. of specially prepared benzoic acid and 10 per cent. of vanillin. This fraudulent product was easily detected by its odor, solubilities and melting point. Acetanilid is frequently met with as an adulterant of vanillin to the extent of 50 per cent., and is usually identified by the same test as those described above, under coumarin, for detecting this substance.

OILS.

Oil of Bergamot.—On examining a large consignment of this oil, conditionally purchased, it was found to contain an abnormally high, 28°, optical rotation, in a 100 Mm. tube. The genuine oil is recorded as never having a higher rotation than 20°. In every other respect the oil tested up well except that the per cent. of linalyl acetate was somewhat low, namely, 28%. A number of adulterants might be added to bring about this abnormality, such as oils of lemon, orange and turpentine, but after taking everything into consideration, the writer came to the conclusion that oil of lemon to the extent of about 20 per cent. had probably been added.

Oil of Cassia.—It seems to be a periodical disease with the Chinamen to adulterate this oil with kerosene, and it is not uncommon to find it adulterated to the extent of 20 per cent. The manipulator unfortunately, however, sometimes makes the mistake of adding more kerosene oil than the oil of cassia will readily mix with; consequently, it has been the writer's misfortune to find oil of cassia to contain a considerable quantity of kerosene floating on top of the cassia oil in an original package. This adulteration has not been met with within the past year, and it is believed that this is chiefly due to the fact that oil of cassia is now largely bought and sold on the basis of percentage content of cinnamic aldehyde. It is hoped that this practice will be extended more and more in the trade for the purpose of gradually rooting out the adulterations of oils. It may not be possible to eliminate adulterations entirely by such a procedure, but it is certain that it will minimize it, and that is the best we can probably hope to do in a great many cases at present.

Oil of Copaiba.—It is not a new thing to tell the members of the American Pharmaceutical Association that balsam copaiba is adulterated with and even substituted entirely by gurjun balsam, but it is doubtful if many of them have met with an oil adulterated with the corresponding oil of gurjun balsam. There are a number of tests given for detecting the presence of this adulterant and some of them are of service, but the writer, so far as his experience goes, has the utmost confidence only in the following: into the bottom of a test-tube place 1 Cc. of glacial acetic acid (99.5 per cent.), add 4 drops of pure concentrated nitric acid and mix well, then add 4 drops of the oil to this mixture, allowing the oil to float on top; if oil of gurjun balsam is present a reddish or purplish zone will be developed between the layer of oil and the acid mixture in a few minutes. No reaction occurs if the oil is pure.

Oil of Peppermint is probably one of the most liberally adulterated oils that is met with, and especially is this true in mixing a high grade oil with an oil of poor quality. Several years ago an oil was met with that showed upon examination to contain at least 25 per cent. of added oil of turpentine. It must be remembered that oil of peppermint is liable to contain a small percentage of terpenes, but no such quantity is admissible, and it should also be said, quite unnatural. Notwithstanding the fact that this oil contains such a considerable amount of added turpentine the specific gravity did not fall materially below the recognized lower limit. On reporting this condition of affairs to the vendor he immediately requested the oil to be returned and he gladly paid all cartage, freight, etc., in addition to $25 for analysis, without making a protest. This in itself was ample evidence that the article was known to be of a spurious character.

The presence of the turpentine was established by a fractional distillation; the first fraction began to come over at 150° C., and 40 per cent. distilled before the temperature reached 180° C. The specific gravity of this fraction corresponded to that of turpentine, and other physical and chemical properties unmistakably proved this fraction to be turpentine. By allowing 15 per cent. for the possible presence of a natural terpene, having a boiling point lying between the above limits, which is quite improbable, we still have left 25 per cent. of added turpentine. Genuine oil of peppermint contains very little material having a boiling point below 200° C. The per cent. of menthol, both combined and free, was also estimated and found to be very low.

It is hoped that the present Committee of Revision will see its way clear to introduce a lower limit of boiling point and a method for estimating menthol. For the benefit of some, the following references to the methods for menthol determinations are given: "Schimmel's Semi-annual Report," October, 1894, page 438; "The Volatile Oils," by E. Gildemeister and Fr. Hoffmann, translated by E. Kremers, page 651, and the Am. Journ. Pharm., 1897, page 189.

Oil of Thyme, white.—It is well known that white oil of thyme contains very little genuine oil of thyme, but consists for the greater part of oil of turpentine, distilled over some herbs of thyme. For this the consumer is in a measure responsible in that he demands a colorless article, which the producer is unable to supply in pure quality, because pure oil of thyme will always be more or less darkened in process of time. It is sometimes stated that pure oil of thyme is not available. This is a mistake. All samples, however, should be carefully tested as to the specific gravity and the percentage content of phenol bodies.

Oil of Walnuts.—Some time ago, while in quest of pure oil of walnuts, several parties purporting to deal in this commodity were requested to send samples and prices for the same. One of the samples was marked "concentrated, white," had a sweetish taste, and was soluble in water. This proved upon farther examination to be nothing but diluted glycerin, flavored with a menthol-like body. Another sample proved to consist of about one volume of oil of mirbane and four volumes of ethyl alcohol. The nature of this mixture was easily revealed by fractionation; three-fourths came over near 80° C., then the temperature rose rapidly to 205° C., which is the boiling point of oil of mirbane, and then the temperature remained stationary until distillation ceased. When it is remembered that oil of walnuts is used chiefly by artists in painting, because it dries with a better film than even linseed oil, the reprehensibleness of such an action can readily be seen.

Oil of Wine (heavy and light).—Up to the present time we are in doubt as to the probability of the composition of heavy and light oils of wine. The various books describe them as consisting of such and such constituents, but no two of them agree on the same. Merck's Index, 1896, describes them quite specifically as to boiling points and to specific gravities. Every effort has been made through all available sources to obtain what might be considered a good quality of these two oils, and invariably the samples would turn out about the same. One light oil of wine submitted proved to be fusel oil. The lighter oil usually had a lower boiling point and a lower specific gravity than the heavy oil of wine, but further than this it was impossible to establish a difference, although there must have been some. The conclusion ultimately arrived at is that the light and heavy oils of wine are undoubtedly obtained in distilling the residue left in the manufacture of ether—the lighter oil being the first portion of the distillate, while the heavier oil is an intermediate or higher boiling point product. It would seem that this theme could be taken up to advantage by some one with ample time, whose careful researches might be of extreme value. The present Pharmacopœia does not prescribe any requirements of any value for ethereal oil except specific gravity. The probable reason for this is that no two manufacturers can produce identically the same quality of heavy oil of wine, and the same manufacturer

frequently encounters difficulties in his efforts to turn out products of uniform quality. It does seem that a standard for heavy oil of wine should be fixed, especially when it is remembered that it is one of the most important constituents of Hoffmann's anodyne.

SIMPLE DRUGS AND ALLIED PRODUCTS.

Beeswax.—This is one of the most frequently adulterated commodities met with. In former years adulterations were of a very gross nature, but within recent years it has been manipulated in a very skillful manner. With ceresin having a color and a melting-point practically the same as beeswax, it is very easy to manipulate beeswax with this article; but the difficulty does not end here, for the up-to-date adulterator knows that beeswax is at present examined in other ways than simply physical appearance and the application of a few crude tests; consequently, he has endeavored to so adulterate the wax that it will comply with nearly all the tests to which this article is usually subjected. By adding a little stearic acid he is enabled to bring up the acid number, which has been lowered by the addition of ceresin, and a little tallow or japan wax will adjust the disturbed saponification number. From this it can readily be seen that he is practically in position to make an artificial beeswax, which will comply with the specific gravity test, acid number and ether number. The melting-point can be adjusted by properly selecting the adulterants. There is only one test left us now, and that is the detection of stearic acid by Fehling's method. It should be noted in this connection that we frequently find stearic acid in beeswax which we have every reason to believe comes from a good source. The reason for the presence of this stearic acid is best explained by remembering that it is not a very unusual thing for beeswax and tallow to be handled together, and accidentally a sample of the former may find its way into the latter. On subsequently purifying the beeswax with dilute sulphuric acid, the tallow is saponified with the production of stearic acid and glycerin; the stearic acid finding its way into the beeswax while the glycerin remains in the liquid portion. Beeswax is also occasionally found adulterated with paraffin and added coloring matter.

Japan Wax is an Asiatic product, and several years ago a large importation was made. On arrival of the consignment it was found that the goods were liberally adulterated with corn starch. It was not evident where the Chinaman was enabled to secure his corn starch, and upon investigation, all evidence pointed to the fact that the wax had been manipulated in this country. The added starch amounted to 20 per cent. After the exposure of this fraud very few cases of similarly adulterated material came to hand, and it is quite probable that this fraudulent material had been entirely withdrawn from the market. The starch was readily discovered with the microscope. A ready method for detecting the presence of starch is by applying a few drops of tincture of iodine directly to the wax

by means of a pipette, and if starch is present the starch-iodine reaction will manifest itself immediately.

Aconite Root adulterated with Tormentilla.—It would seem on first thought that such a clumsy adulteration as the above would be too apparent for any one to practice. This point we will not gainsay, but an inspection of the samples will convince any one that a hasty examination would not reveal this adulterant, inasmuch as many of the tormentilla roots grow in form similar to aconite root.

Capsicum vs. Paprika.—The United States and the British Pharmacopœias recognize C. fastigiatum, Blume, while the German Pharmacopœia recognizes C. annuum, L. The latter is generally considered the source of paprika. The United States Bulletin No. 13 on "Spices and Condiments," classes paprika as cayenne. It is, therefore, not surprising that many of us are of the opinion that these two articles are one and the same; but a comparison of samples will show that there is a vast difference. The color of paprika varies from scarlet to yellow. As a matter of fact, there are a number of species of capsicum and a host of varieties all varying more or less in degree of pungency. The degree of pungency and certain particular flavors are said not to be due only to the species but also to the method of cultivation and locality. About a year ago the writer's attention was called to what was considered to be red pepper. An investigation showed, however, there was a decided difference in physical appearance to begin with between this powdered article and that of the genuine product; the color was considerably brighter, and only about one-sixth as pungent as genuine red pepper. A tincture prepared from it also presented an abnormal reddish cast. On submitting the paprika to a quantitative examination it was found that there is practically little difference between the data obtained for this article and the usually accepted constants for capsicum. A microscopic examination did not offer any assistance. It can thus readily be seen that with such an article as this the adulterator has in his hands a most efficient diluent of red pepper.

That paprika (C. annuum L.) should be substituted for capsicum fastigiatum, Blume, is really not new, for Flückiger and Hanbury, "Pharmacographia," 2 ed. page 452, say, "It furnishes the largest kind of pod pepper and, as we believe, much of the cayenne pepper which is imported in the powdered form." In the "American Dispensatory," 1898, page 434, we fine, "It (C. annuum) undoubtedly forms a large part of ground red pepper."

Cochineal (*silver and black*).—Pure (black) cochineal is of a purplish-gray or purplish-black color, and it is surprising how few druggists know or have seen the pure article. It is the general custom to add some white material to the pure cochineal in order to bring out the silvery appearance (sic) which is so characteristic of the commercial cochineal. The kind and amount of added material varies quite considerably, being,

as the writer has found sometimes, barium sulphate to the extent of 30 per cent. talcum, calcium sulphate, calcium carbonate and magnesium carbonate.

Elm Bark, powdered.—It is a common occurrence to find this article adulterated with wheat flour. As much as 30 per cent. has been met. The microscope will reveal this diluent.

Jaborandi Leaves mixed with Twigs, Stems and Sticks to extent of 20 per cent.—While this probably does not come directly under the heading of adulteration as it is usually understood, yet there can be no doubt in any one's mind present that an undue amount of such substance must have been added with a purpose, for it is well known that the addition of such products must necessarily impair the medicinal efficiency of the drug to which they have been added. In the liberal sense of the word, they must be considered adulterants. This is simply an example of many drugs that are found containing such added foreign material. Frequently as high as from 20 to 30 per cent. of such matter is found in crude drugs. It might also be stated in this connection that roots sometimes contain as high as 20 per cent. of earthy matter. In the powdered form it is nearly impossible to detect such impurities. Such drugs are not fit for medicinal use. If crude drugs free from such diluents and other impurities and debris cannot be purchased in the open market, garbling must necessarily be resorted to before use.

Lactucarium.—There is no doubt as to what the nature of this article should be. The Pharmacopœia distinctly specifies what is wanted. During the past year, when lactucarium was materially advanced in price, there was received extract of lettuce when lactucarium was wanted. It seems that anything of this character should be repudiated in the most vigorous terms, because the two articles are so entirely different and distinct that there is no possibility of confusing the one with the other, except for pecuniary gains.

Rock Candy Syrup is probably an article which is used as freely by many druggists as any other commodity he deals in, and it is well known that it generally contains a small percentage of invert sugar, which finds its way into the syrup in the course of its manufacture by atmospheric influences. Certain dealers having knowledge of this, thought that a little more reducing sugar would not do any harm, and consequently, when rock candy syrup was ordered they supplied glucose of the same specific gravity as the rock candy syrup usually furnished. A superficial examination might not have revealed the nature of this fraud, but it is easily detected by the application of Fehling's Solution, or placing a suitable quantity of the syrup into a porcelain capsule, then evaporating on a steam or water-bath. A glucose syrup will simply assume a heavier body, while pure rock candy syrup will dry completely, with either distinct crystals or crystalline crusts, or both.

Venice Turpentine.—There are at present three articles on the market

which pass under this name. One is the genuine Larch Venice turpentine; another is an imported artificial product; and the third is a domestic artificial product. The genuine article brings quite a good price, and being of such a composition that it is very difficult to get at the actual component compounds, the adulterator has worked along the lines of substitution so skillfully as to be able at present to imitate the genuine article very closely at a very much lower cost. Certain data have, however, been worked up in connection with pure Venice turpentine, which up to the present time the sophisticator has not been able to fully comply with. The writer is at present collecting certain data upon this question and hopes to make them public in the near future. Some useful information will be found in the Amer. Jour. Pharm., Vol. 73, page 198, 1901. The artificial product consists for the most part of specially selected rosin dissolved in oil of turpentine. Another article has also been met with which had a decided fluoresence and proved upon investigation to consist of rosin or allied bodies dissolved in a fluorescent rosin oil, mixed with a little turpentine.

Gum Acacia.—On looking over the various price lists we find that there are at least five distinct varieties of this gum, varying very materially in price. There are only the following conclusions to arrive at, namely: Either the lower grades of acacia are spurious products, or they are gums of an inferior quality. The latter is probably the correct explanation, inasmuch as we find upon examining the various goods that there are very few which will stand the Fehling's test. This test indicates that there are associated with these poor gums certain substances which ought not to be present in a first-class article. The point naturally presenting itself in this connection is—How are we to decide whether a sample of gum acacia submitted is of an A No. 1 quality, or whether it contains more or less of the selected portions of the inferior grades of other gums? Chemical tests practically fail us. To be sure we have the ash test, the optical rotatory power, the ferric chloride solution test, the relative viscocity, etc., but after applying all these tests and asking ourselves this question, is the sample submitted genuine gum arabic? we are compelled to say, we do not know. The writer is inclined to believe, from the fact that there is very little gum acacia which will not reduce Fehling's test solution, at even a slightly prolonged elevated temperature, that very little A No. 1 gum acacia is found in the market. The various grades are probably differently selected gums from the same or similar sources.

Gum Tragacanth shares the common fate of gum acacia, inasmuch as the best quality is about twice as expensive as the lower grades, and with this article we are practically unable to do anything relative to deciding between the inferior and the superior product. There do not seem to be any marked differences except physical appearance, and the viscocity test between the expensive and the cheaper articles. It can readily be seen,

therefore, that the one is liable to be substituted for the other, especially in powdered form, in cases where the greatest care is not exercised by the purchaser.

Kino. — During the past few years the official product appears to have been in the hands of a monopoly, and an article has been supplied occasionally which represented the genuine very closely. In fact, there appeared to be so very little difference between the genuine article and that supplied, that it was necessary to resort to a chemical analysis in order to differentiate between them. One sample, nevertheless, complied with the usual tests so closely that it was impossible to find a point of distinction except that the fresh official product possessed a slight aromatic odor which the sample supplied did not have, but this cannot be considered a distinguishing feature, inasmuch as all kino will lose its peculiar aroma in process of time. This sample contained even more tannin and was more readily soluble in alcohol and in water than the pharmacopœial article, as the following result clearly shows:

Kind.	Ash %.	% Insoluble in 95 % Alcohol.	% Insoluble in Water.	% of Tannin.
True	1.48	8.20	31.04	51.07
True	0.84	10.54	26.98	43.91
Unknown	1.14	7.08	1.16	57.26

The sample marked "unknown" is the one referred to above.

Aloes.—It is well known that the various kinds of aloes are substituted one for the other, and it is quite unnecessary to make much comment in this connection. Very little Barbadoes finds its way into commerce. That which is labeled as such and put up in the usual Barbadoes package is conceded to be for the most part pure Curaçoa. There are reasons for believing that Curaçoa is also sold for the other kinds of aloes. We may be in position in the course of time to be able to apply tests which will distinguish between these several varieties, inasmuch as very extensive chemical investigations are at present being made on the composition of the different kinds of aloes.

Asafetida. — The poor quality of asafetida has, during the past few years, been brought up on a number of occasions. It is referred to here simply to give additional testimony to the inferior quality of the article as usually supplied to the trade in this country. The adulterants are chiefly soft rocks and other earthy matter.

CONCLUSION.

The reader has undoubtedly noticed in going over the above results that gross adulterations are very little practiced at present. In closing this paper the writer wishes to leave impressed upon every mind one last thought, viz., adulterations are generally carried on in such a way that they are not, in most cases, perceptible to the naked eye, and it is necessary to resort to the test-tube, the analytical balance, the microscope and the

polariscope, before positive conclusions can be arrived at. It, therefore, behooves every druggist who is not in position to carefully examine his own goods to secure them from such dealers or manufacturers as are known to carefully and conscientiously investigate the commodities they handle.

The following two contributions from the pharmacognostical laboratory of the University of Wisconsin, involving work done for the Committee on Research, were read by title and referred for publication.

STRUCTURE OF STEM BARK OF HAMAMELIS VIRGINICA, L.

BY A. E. JENSEN AND R. H. DENNISTON.

Witch-hazel,* known also as winter bloom, snapping hazel nut, spotted alder, etc., occurs in nearly all parts of the United States, chiefly in damp woods and thickets along the moist banks of rivers east of the Mississippi.

It is a shrub consisting usually of several crooked branching trunks arising from the same root, some four to six inches in diameter, five to twelve, sometimes twenty, feet in height and covered with a smooth brown bark, the older bark becoming brownish-gray and fissured, and the inner portion being whitish and smooth.

The fluid extract is usually prepared from the leaves, although it has been stated that the bark is much used for this purpose.

The bark† appears on the market in thin pieces. It has a dark gray or brownish-gray color, and an easy separable grayish cork which, when removed, exposes a pale, cinnamon-brown colored surface. The bark is covered with small dark brown lenticels.

The bark used in this study was collected by Prof. L. S. Cheney in October, 1900.

A general description of the different tissues in their respective positions, from the outside to the center, is here given.

The epidermis is not present, and the first tissue found at the outside is a cork layer. This occupies about one-fourth the thickness of the entire bark in a stem three years old.

In such a stem, the bark averages .45 mm. in thickness; the cork .11 mm.; the collenchyma about .13 mm.; the bast fiber region .05 mm.; and the phloem .15 mm. respectively. (See Fig. 1, p. 411.)

The cork region (Fig. 2, p. 411) consists of tangentially compressed cells with brown contents. At the outside a broken appearance is presented, where the cells have been torn away.

From two to five rows of cork cells (□) directly inside are rectangular and arranged in radical rows. They are free from contents. These cells vary in size from 30 to 40 μ in length by 18 to 30 μ in width. As seen in

* Am. Dr., 13, p. 1.

† Sayre's Organic Materia Medica.

longitudinal radial section (Fig. 4), the cells assume a uniform shape, being almost square and measuring about 20 μ in either diameter. The thickness of the walls is uniform, measuring from 1 to 2 μ.

The collenchyma (Coll., Fig. 2) consists of several rows of regularly arranged elliptical cells, followed towards the inside by a region of cells loosely arranged and not in rows. The cells of the collenchyma are tangentially elongated and vary in size from 20 to 45 μ in length by 6 to 10 μ in width. The walls are very thick, in some instances equaling the diameter of the cell cavity.

The portion of the primary cortex following the collenchyma on the inside is made up of round and elliptical cells separated by many intercellular spaces. The cells range in size from 20 to 50 μ in length and from 8 to 12 μ in width, and have comparatively thin walls. Crystals of calcium oxalate in various forms are well distributed throughout the region. The prismatic crystals vary in size from 9 to 16 μ, while the rosette crystals (Cy″) average 20 μ in diameter. Clusters of fine "Crystalsand" are found in the center of the cells.

The cells of the collenchyma region have much the same appearance in longitudinal radial as in transverse section (Fig. 4). They have an elongated oval form, and show under higher magnification many simple pits in the walls. (See Fig. 7.)

A transverse section of the outer bark taken from a stem fifteen years old (Fig. 5) shows but little change other than that of relative amounts of tissue.

The bast fiber region (Fig. 3), which occurs immediately outside the secondary bark, is composed of bast fibers and stone cells. As seen in transverse section, the bast fibers are found grouped together, alternating with larger sclerenchyma cell groups. The fibers have an average diameter of 9 μ and are round or elliptical in shape. The central cavities are small.

In longitudinal radial section the fibers show their usual form. The average length was found to be slightly more than 0.6 mm.

The sclerenchyma or stone cells vary greatly in size and shape. (Fig. 3.) The large ones measure 80 μ in length by 40 μ in width; small ones have about the same size in cross-section as the bast fibers. The walls are greatly thickened and pits numerous and plainly visible. They are easily seen in longitudinal section.

The phloem (Phl., Fig. 3) underlying the bast region consists of irregular, moderately thick-walled cells. The larger sieve cells vary from 170 to 200 μ in length and average 13 μ in width. The smaller cells have no regular form.

Single rowed medullary rays are distinctly seen penetrating this region (M., Fig. 3).

In longitudinal radial section the sieve cells and phloem parenchyma

FIG. 1.

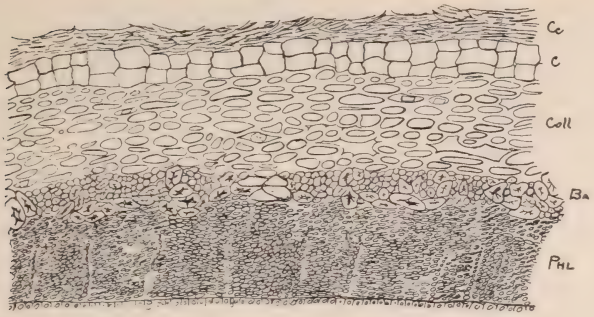
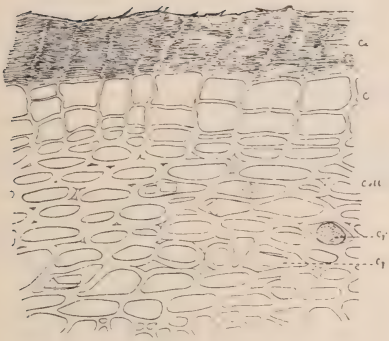


FIG. 2.



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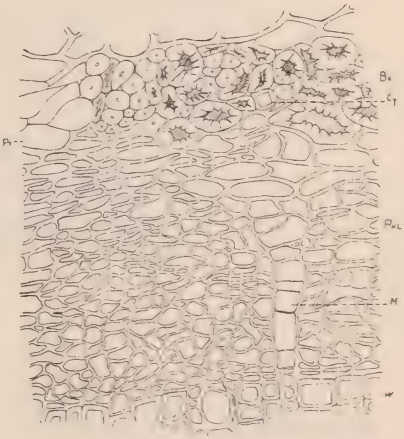

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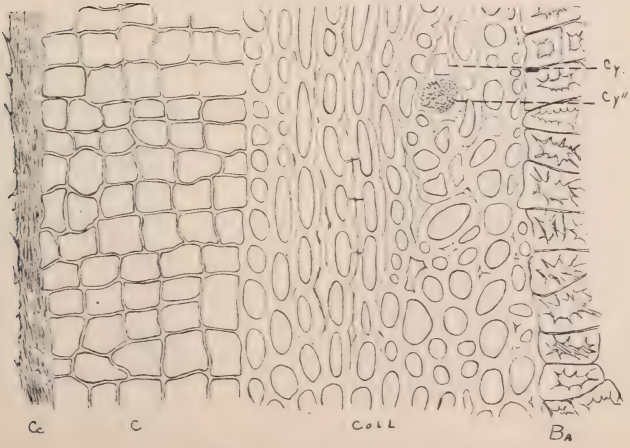


STRUCTURE OF STEM BARK OF HAMAMELIS VIRGINICA, L.

FIG. 5.

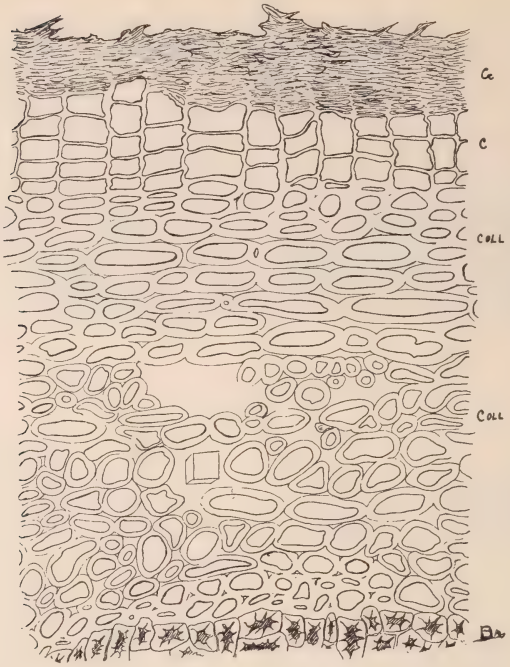


FIG. 7.

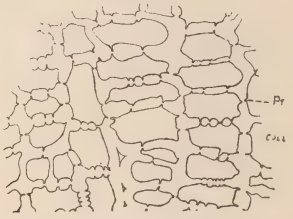


FIG. 6.

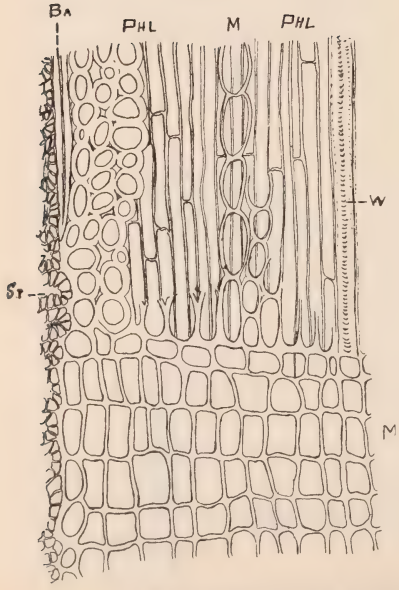
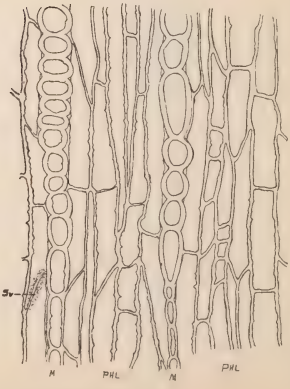


FIG. 8.



STRUCTURE OF STEM BARK OF HAMAMELIS VIRGINICA, L.

elements are plainly seen. The latter have a diameter of nearly 10 μ and are frequently filled with tannin.

In a longitudinal tangential section (Fig. 8) a view across the end of the medullary rays is shown. The cells are completely filled with small round starch grains. Some of the cells are rounded, others are elongated, ranging in size from 23 to 66 μ. In this view the perforated end walls of the sieve cells show plainly.

A longitudinal-radial section through the phloem region (Fig. 6) shows broad plates of medullary ray cells, rectangular in shape, with rounded corners, the average diameter ranging from 20 to 25 μ.

In making the above study, bark preserved in alcohol was used, the sections were made by the free-hand method and the drawings were made by the aid of an Abbe camera-lucida.

EXPLANATION OF PLATES.

Fig. 1. Transverse section of bark from a three-year-old stem.

Fig. 2. Transverse section through cork and collenchyma regions.

Fig. 3. Transverse section through hard bast and phloem region.

Fig. 4. Longitudinal radial section through cork and collenchyma region.

Fig. 5. Transverse section through fifteen-year-old bark, showing cork and collenchyma.

Fig. 6. Longitudinal radial section through phloem region, showing medullary ray.

Fig. 7. Tangential view of collenchyma, showing pitted walls.

Fig. 8. Tangential view of phloem, showing end view of medullary rays.

LIST OF ABBREVIATIONS.

Ba. = Bast.
C. = Cork.
CC. = Compressed Cork.
Coll. = Collenchyma.
Cy. = Crystal.
Cy′. = Rosette Crystal.
M. = Medullary ray.
Phl. = Phloem.
Pt. = Simple pits.
St. = Stone cells.
Sy. = Sieve cells.
W. = Wood.

THE STRUCTURE OF THE STEMS OF MYRICA GALE, L. AND MYRICA CERIFERA, L.

BY A. G. KREMBS, JR., AND R. H. DENNISTON.

The order *Myricaceæ* or family of Galeworts, as now constituted, contains but a small group of plants, generally classified with the *Amentaceæ*. In its botanical relationship it is anomalous, being closely allied with several orders.

The genus contains about thirty-five known plants of an aromatic, shrubby character, distributed for the most part in temperate regions. At least six species are indigenous to North America. But one species, *Myrica gale*, is found in the bogs of Northern Europe. This is likewise generally distributed through the middle and northern United States and extends as far north as Alaska. Several species are reported from the West Indies and one from the Andean region of South America. Others are found in Southern Africa, India and China. All medical writers and botanical authorities, even as early as Linnaeus, describe the plants of this genus as useful in the arts and possessing valuable medicinal properties. As yet they have obtained but little recognition in the practice of the medical profession.

Myrica gale is the most widely distributed species. Some of its numerous synonyms are sweet gale, meadow fern, bog myrtle, Dutch myrtle, willow myrtle, bay brush.

The entire plant is used and also the separated bark. To it are ascribed pectoral, astringent and aromatic properties. The infusion has been also applied externally for the cure of itch and used as a substitute for hops in brewing. The entire plant is useful in dyeing and tanning.

Myrica cerifera is the indigenous species that has attracted the most attention in the United States. Its common names are wax myrtle, wax berry, candle berry and bay berry. The nuts of this species are incrusted with a wax-like tallow. Myrtle tallow was utilized by the pioneer settlers, and we have accounts, dating back to the early part of the eighteenth century, of the methods generally adopted by each family to furnish themselves with a supply of this wax for lighting purposes.

In South America they are still using this substance, only obtaining it from another member of this family, *M. pubescens*.

The bark has attracted some attention, but principally among the eclectics, and is an ingredient in the so-called "Thompsonian Composition Powder." To this bark are ascribed stimulant, astringent, antiscorbutic, antispasmodic, sialagogue and errhine properties. It has been extensively used in domestic practice as a vegetable astringent in diarrhœa, and as early as 1804 Dr. Benjamin Smith Barton, then professor of materia medica and botany in the University of Pennsylvania, called attention to it "as a powerful astringent used with success in diarrhœa," and states, "the decoction has also been used with much advantage in dropsical affections,

succeeding intermittents, and in the treatment of hæmorrhage from the uterus, etc." The decoction has also been used as a gargle in inflammation of the throat, and as an injection in leucorrhœa. The powdered bark has been applied externally as a stimulant in indolent ulcers. In large doses it is said to be acrid, drastic and emetic.

The stems of the plant will be the only part taken into consideration. They were collected by R. H. Denniston at Wood's Holl, Mass., July 20, 1899, and are from 4 mm. to 6 mm. in diameter.

The outer surface of the stems of *Myrica gale* is of a reddish-brown color, and shows numerous well-marked lenticels.

The cut end of the stem exhibits a thin bark, the outer portion of which easily breaks away. The bark is very easily detached from the underlying portions, making it difficult to cut a transverse section without this separation taking place. The layers of the bark are easily distinguished from the wood without the aid of a lens, and the medullary rays as they extend out from the pith can easily be detected. The pith region is hardly to be distinguished by the naked eye.

The entire cork region composes about one-third of the bark (C., Fig. 1, p. 418).

The outer cork cells, already described as being easily separated from the later cork, are composed of very thin, indefinite but regular cells of a brownish-red color. The cork cells lying directly beneath are identical as far as general appearances are concerned, only that they are somewhat wider. The cortical parenchyma (C. P., Fig. 1), which occupies about the same space as the cork, appears somewhat less regular, due to a band of bast fibers and crystal cells (S. C.; B. F. and P. C. O., Fig. 1). Hooper calls attention to a remarkable stratum of stone cells existing in the bark of *Myrica nigrum* and *Myrica asplenifolia*. A similar band existing in *M. gale* and *M. cerifera* would seem to indicate that this is a structural characteristic of the order.

The secondary cortical parenchyma (Ph., Fig. 1) together with the bast fiber region, make up the other third of the cortex.

The wood (Xy., Fig. 1) appears in numerous narrow wedges separated by narrow medullary rays (M. R., Fig. 2) extending well into the bark.

The spring and fall wood are well marked regions, and Fig. 1 shows that the formation of the more open spring wood had not as yet begun for the third year and also that the second year's growth exhibits more large vessels than the first.

A small pith region (P., Fig. 1) with thickened cell walls and brownish contents appears in the center of the stem and can easily be distinguished from the wood. The cork cells, as they appear in a cross-section, magnified 265 diameters, are flattened tangentially, the outer cells (C., Fig. 2) being more compact and filled with a reddish-brown content. Their exact outline can barely be distinguished. The length of these cells varies from 33 to 66 μ or about twice that of the younger cork. A small quantity of tannin was found in this region by treating with a solution of ferric chloride.

The younger cork cells (C″., Fig. 2) are much more clearly defined in outline, being from 3 to 35 μ radially and from 16 to 50 μ tangentially and containing a considerable quantity of tannin. In the outer radial section the outer cork cells appear less compact and much shorter and more clearly defined than in transverse section (C., Fig. 4), and the gradual increase in size towards the center is noticeable. The length varies from 10 to 37 μ. The cells of the cork in a longitudinal-tangential section are irregular in form. Here and there, scattered throughout the section, are numerous cells with dark-brown colored contents.

The cells of the cortical parenchyma (C. P., Fig. 2) exhibit a vast difference in size, ranging from 6 to 20 μ radially and 16 to 73 μ tangentially. The cells of the outer row in the collenchyma are considerably smaller than those directly inside and contain little or no cell contents, while those comprising the remainder of this region are of various shapes, ranging from the large oblong to the small nearly cylindrical. The large cells, as a rule, taper somewhat at the ends. The cell walls are moderately thick, and along the lower portions of the region will be found occasionally an intercellular space. Tannin is abundant throughout this region, and a small amount of starch is also present. The cells containing the starch are entirely separated from one another, having as many as from two to eight cells between them, and a single starch-containing cell lying directly above the bast fiber group (B. F., Fig. 2). These cells have about the same general appearance as those surrounding them.

Having about the same position as the starch cells, but occurring more frequently, are the cells containing rosette and prismatic calcium oxalate crystals (R. C. and P. C. O., Fig. 2).

In the longitudinal-radial section, the cells of the outer cortical (C. P., Fig. 4) region appear more regular in size, the cell walls are much thicker and occasionally an intercellular space can be detected.

The cells range from 10 to 50 μ in length, some, especially the smaller ones, assuming a cylindrical shape, while the large ones are rounded at the ends.

The rosette crystals (R. C., Fig. 2) stand out prominently, the cells that contain them as a rule are separated by intercellular spaces.

The bast fibers (B. F., Fig. 2) are white in color and from 6 to 16 μ in diameter with greatly thickened walls, showing a distinct concentric stratification. The central cavities are almost obliterated. Associated with the fiber cells, rosette and prismatic calcium oxalate crystals (P. C. O. and R. C., Fig. 2) are found, together with numerous well defined sclerenchyma cells.

The Brachysclerids shown in S. C., Fig. 2 are found, from 13 to 26 μ radially and from 16 to 66 μ tangentially and occur alternately with the groups of bast fibers; occasionally crystal cells may be seen separating two grounds of bast fibers. Each group shows from five to twenty-five fibers.

The stone cells are filled with tannin, the lumen occupies about one-half of the cell diameter. In a transverse section the crystal cells vary but little in size and shape, and have a diameter of from 16 to 20 μ. This region in the longitudinal-radial section has an entirely different appearance. The bast fibers (B. F., Fig. 4), showing their immense length, can be easily seen as they gradually taper to an end without any irregularity, and the very narrow cavity running throughout their extent.

The stone cells (S. C., Fig. 4), forming one continuous concentric band, are greatly elongated, and are often found to be one-half the length of a bast fiber. The crystal cells (R. C., Fig. 4), appear about the same as in a cross section, being from 13 to 20 μ.

In a transverse section of the secondary cortical parenchyma (Ph., Fig. 2) we have less variations in size of the cells, although they vary from 6 to 16 μ radially and from 10 to 40 μ tangentially. The cell contents directly beneath the bast fiber region appear to be more granular than those directly following, but upon treating with ferric chloride the tannin seems to be equally distributed. This test may also aid in showing the breadth of the medullary rays as they extend up into this region, as the cells surrounding them are not affected by the ferric chloride. The cell walls in some instances are thicker than in the primary cortical parenchyma, while but few intercellular spaces can be found. The shape of the cells resembles that of the primary cortical parenchyma, although the majority of the cells are much smaller.

In longitudinal section (Ph., Fig. 4) the parenchyma cells are seen to vary in length, ranging from 50 to 200 μ. The color and contents appear the same as in the transverse section.

In a transverse section of the xylem (Xy., Fig. 3) the numerous narrow medullary rays largely filled with tannin are seen to run from the pith to the inner limits of the secondary cortical parenchyma. The area between these rays is occupied towards the interior by large tracheæ (T., Fig. 3), while towards the cortex region we find thickened wood fibers. In some cases, especially along the outer part, the wood parenchyma elements lie in radial rows. The large vessels are congregated towards the inside of the annual rings (Fig. 1).

In transverse sections the wood parenchyma cells are largely angular and some are rounded at the corners and have a diameter of about 6 to 26 μ. The large wood vessels are from 20 to 36 μ tangentially. The cell walls are strongly pitted and thickened. The large tracheæ and distribution of same can be seen in Fig. 1. They are more abundant in the spring wood, and in some instances occupy a band around the entire stem, clearly defining the year's growth. The medullary rays extending through this region may be mentioned here. They extend from pit to cortex, and are largely filled with tannin. In transverse sections the cells are rectangular, the longer dimensions lying in the radial direction. They

FIG. 1.

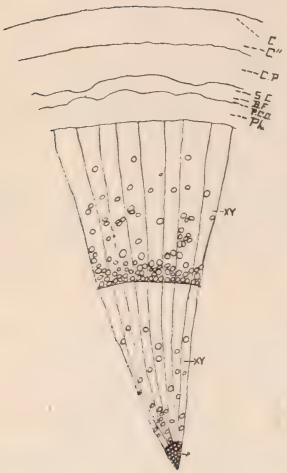


FIG. 2.

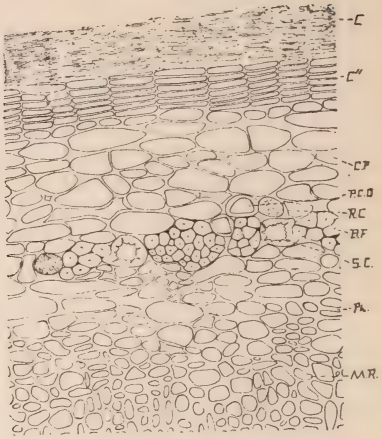


FIG. 3.

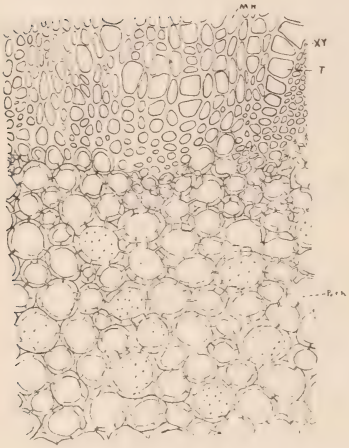


FIG. 4.

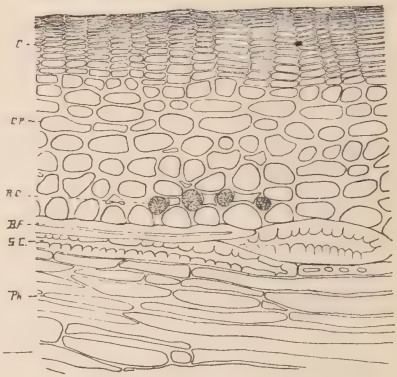


FIG. 5.

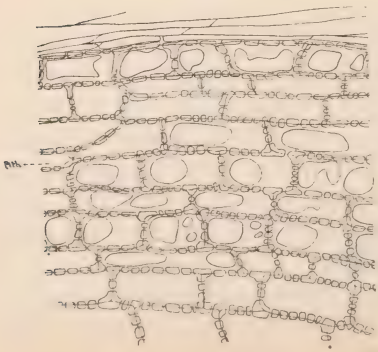
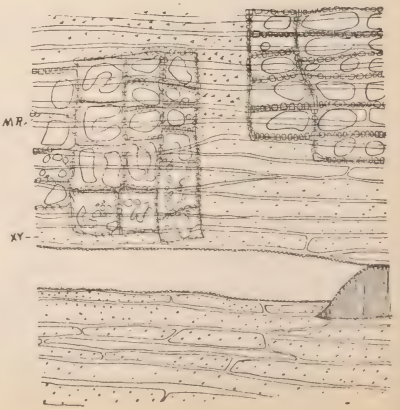


FIG. 6.



THE STRUCTURE OF THE STEMS OF MYRICA GALE, L.

FIG. 7.

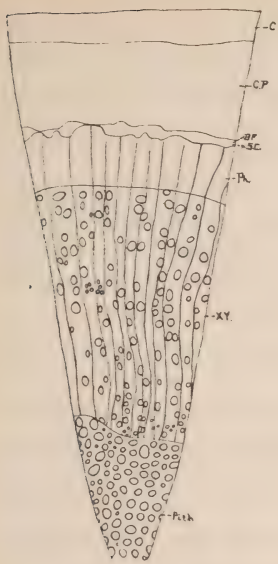


FIG. 8.

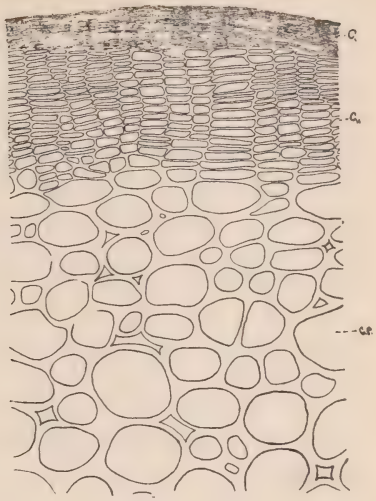


FIG. 9.

FIG. 11.

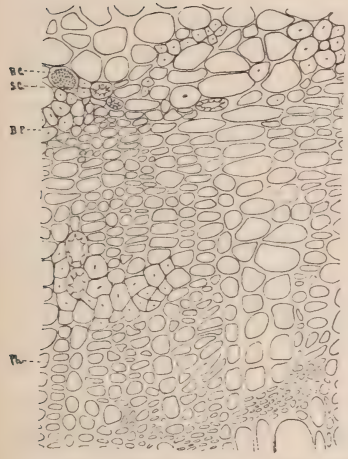


FIG. 10.

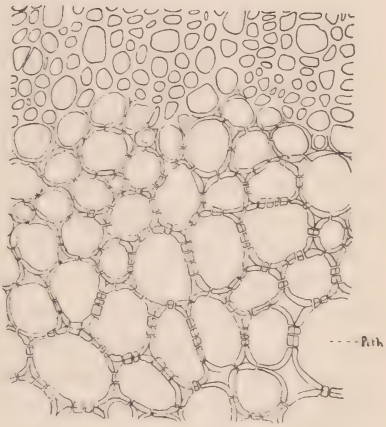
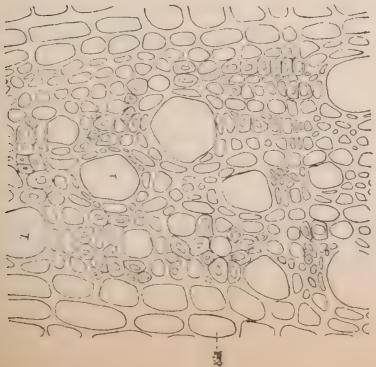
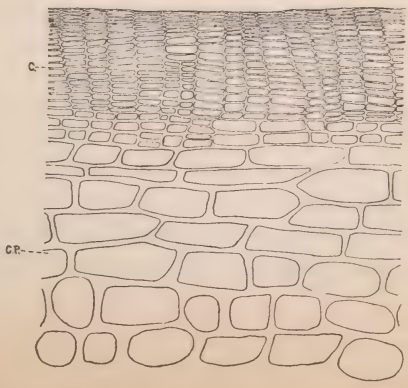


FIG. 12.





range from 13 to 33 μ radially and tangentially from 5 to 10 μ. The walls are considerably thickened, in some cases more so than in the surrounding cells. The pitting, although frequent, is quite as indistinct as in the wood cells.

The fibrous form and pitting of the wood cells can easily be seen in a longitudinal-radial section (Xy., Fig. 5). Some of the cells are elongated, tapering at both ends, others are angular, while both are marked with round X and slit-like pits. In a longitudinal-tangential section the pitting and contents is brought out much more clearly than in the views above mentioned. The cell walls are somewhat irregular, but show plainly the numerous pits. The smaller cells average about 100 μ in length, while the larger ones average about 300 μ.

A longitudinal-tangential section of wood, showing the comparative length of the wood fibers and wood cells. In a longitudinal-radial section (M. R., Fig. 5) we have either the cells of the medullary rays about square or elongated radially, and varying in size from 13 to 16 μ in width and from 16 to 26 μ in length. The cell walls in this view show the simple pits very plainly, also the very marked thickening.

In the longitudinal-tangential section through the wood region the rays are seen to be numerous and of about the same width as the average wood cell. An abundance of tannin is found. The cells of the medullary rays vary from 23 to 50 μ in length.

The central pith (P., Fig. 3) can easily be distinguished from the wood surrounding it by the well developed cell wall thickening and pitting. The walls are strongly thickened and heavily pitted, the middle lamella can easily be seen. The cells of the pith region are separated by intercellular spaces at least towards the center. Occasionally a pitted transverse cell wall can be seen. The majority of the pith cells are filled with tannin and mucilage in an amorphous mass, the latter giving the characteristic blue color upon the addition of a solution of iodine followed with a drop of concentrated sulphuric acid. Like masses are found in the medullary ray cells. The diameter of these cells is from 6 to 16 μ. In a longitudinal-radial section (Fig. 6) these cells appear either square or oblong, having in few cases rounded ends, while the remainder are large and angular. The pitted transverse cell wall can also be seen in some of the cells. This section resembles somewhat that of the medullary rays in longitudinal section (M. R., Fig. 5) in cell wall and cell contents. The cells range from 23 to 50 μ in length.

MYRICA CERIFERA.

Myrica cerifera is the indigenous species that has attracted the most attention in the United States.

The stems are considerably larger than in the *Myrica gale* and range from 5 to 8 mm. in diameter. The material used was also collected by

R. H. Denniston at Woods Holl, Mass. The stem has a grayish mottled appearance. The outer cork, covered with a paper-like epidermis, can readily be separated (C., Fig. 8) from the inner bark when the exposed surface is rugged, and admits of being highly polished. The bark (Fig. 7) has about the same general appearance as that of *M. gale*, while the wood differs only in having the large wood cells distributed throughout the entire xylem (Xy., Fig. 7), while in *M. gale* they are found almost entirely along the spring deposition. The pith region occupies considerably more space, as Fig. 7 will show, also showing the cells to be much larger.

In a transverse section (C., Fig. 7) the outer cork cells have the same massed appearance as in *M. gale*, while the inner or newer cork cells (C'', Fig. 8) are less regular and measure from 2 to 3 μ radially and 11 to 33 μ tangentially. The color of the cells is reddish-brown, deepening as they extend inward to a dark brown. The longitudinal-radial section of the cork (C., Fig. 12) is nearly identical with the same section in *M. gale*, being of about the same length and width and measuring on the average 13 to 36 μ.

The cells of the primary cortical parenchyma in a transverse section (C. P., Fig. 8) exhibit much thickened cell walls which occasionally are reduced by an intercellular space. Scattered throughout this region we find a few stone cells. Tannin and starch are found abundantly, the latter appearing in small grains and forming an incomplete layer above the bast fiber region. The cells range from 19 to 47 μ radially and from 19 to 78 μ tangent y.

In a longitudinal-radial section (C. P., Fig. 12) the cells are larger, ranging from 29 to 117 μ in length. In form they resemble the cells in *M. gale*, both in transverse and longitudinal section. The bast fibers and stone cells (B. F. & S. C., Fig. 9) form a band similar to those already mentioned in the other Myrica species. In *M. gale* we have them forming one distinct band (B. F. & S. C., Fig. 2) and slightly if at all deviating from it, while in this plant we have the stone cells scattered throughout the primary cortical parenchyma and the bast fibers and occasionally a stone cell mass in the secondary cortical parenchyma. The stone cells and bast fibers have about the same diameter as in *M. gale*. The rosette and prismatic calcium oxalate crystal cells (R. C. and P. C. O., Fig. 9) are also found, but occur less frequently. In the longitudinal-radial section the stone cells appear in one continuous concentric band just as in *M. gale*, only differing slightly in that they appear to be elongated radially as well as tangentially, while the same cells in the other species are elongated lengthwise and are of considerable length. In both transverse and longitudinal radial sections the secondary cortical parenchyma resembles the same tissue in *M. gale*, only that here we occasionally find an isolated stone cell with a mass of bast fibers in this region. A small quantity of

starch and tannin is also present. In comparing a transverse section of the wood of these two species, we find them almost alike, the only difference being in the tracheæ of *M. cerifera* (T., Fig. 10), which are much larger, varying from 20 to 55 μ radially and from 19 to 40 μ tangentially, and the large medullary ray (M. R., Fig. 10) cells containing a considerable quantity of starch.

In a longitudinal radial section of these two plants we find no differences, otherwise than those above mentioned. Without the aid of a micrometer this difference would hardly be apparent.

The strongly-thickened and heavily-pitted cell walls of the pith (Fig. 11) show the middle lamella and intercellular spaces separating the cells. This is also like that of *M. gale*, only that the cells are much larger and contain a considerable quantity of starch and tannin. They are from 22 to 66 μ radially and from 24 to 63 μ tangentially.

In comparing the two species under consideration, we find that they have almost the same general structure as well as contents. The outer cork cells are almost exactly alike, while in the inner cork we have only a slight irregularity in *M. cerifera*. The cells of the wood are somewhat larger in the latter species, as are also the medullary rays, which contain starch instead of tannin, as in *M. gale*.

The contents of the pith of the last named species is largely made up of mucilage, while here we have starch grains in sufficient quantities to make the cell contents appear as a dark mass when treated with iodine. The pith cells (Fig. 11) are considerably larger than those of *M. gale* and show distinctly the cell wall thickening and pitting.

EXPLANATION OF PLATES.

Fig. 1. Diagrammatic view of cross section of stem of *Myrica gale*. Magnified 18 diameters.

Fig. 2. Cross section showing details of bark. Magnified 88 diameters.

Fig. 3. Cross section showing pitting of the pith. Magnified 88 diameters.

Fig. 4. Longitudinal-radial rection of bark in detail. Magnified 88 diameters.

Fig. 5. Longitudinal-radial section of wood showing the pitting of same and large tracheæ vessels and medullary rays. Magnified 88 diameters.

Fig. 6. Longitudinal-radial section showing the pitting of the pith. Magnified 88 diameters.

Myrica Cerifera.

Fig. 7. Diagrammatic view of cross section of stem of *Myrica cerifera*. Magnified 133 diameters.

Fig. 2. View of cork and cortical parenchyma, transverse section. Magnified 88 diameters.

Fig. 9. View of bast fibers and stone cell band and secondary cortical parenchyma, transverse section. Magnified 88 diameters.

Fig. 10. Cross section through wood, showing the large spring vessels and medullary rays. Magnified 88 diameters.

Fig. 11. View of the pith and pitting of same, transverse section. Magnified 88 diameters.

Fig. 12. View of cork and primary cortical parenchyma. Longitudinal-radial section. Magnified 88 diameters.

All plates were drawn from nature with the aid of the Abbe camera lucida.

ABBREVIATIONS.

C.	= Outer cork.	B. F.	= Bast fibers.
C″	= Inner cork.	M. R.	= Phloem or secondary cortical parenchyma.
C. P.	= Cortical parenchyma.		
S. C.	= Stone cells.	Xy.	= Xylem.
R. C.	= Rosette crystals.	T.	= Tracheæ.
P. C. O.	= Prismatic calcium oxalate crystals.	M. R.	= Medullary rays.
		P.	= Pith.

THE CHAIRMAN: It occurs to me that one of the papers read a while ago—the one read by Mr. Carl Hinrichs on gasometric tests—ought to have been referred to the Pharmacopœial Revision Committee, to be considered in common with other papers that have been referred to that committee.

Mr. Mayo moved to so refer, and the motion prevailed.

Mr. Stedem having come into the room since his paper on "The Cold Nitric Acid Test for Albumen" was called up and passed for publication, was permitted to abstract his paper orally and make some experiments with glass tubes illustrative of his subject.

The next business before the Section was the installation of officers, and the chair appointed Mr. Sayre a committee to conduct the new officers to the platform.

Mr. Sayre performed that pleasant duty and introduced Mr. Kebler as the new Chairman.

MR. KEBLER: I want to thank the members of this section for the honor conferred on me. I feel a great responsibility in taking this position, from the fact that such eminent and excellent work has been done here. I assure you I shall do the best I possibly can to give you good work for the next year. (Applause).

Mr. Kebler takes the chair.

Mr. Sayre introduced the new Secretary, Mr. Jos. W. England.

MR. ENGLAND: Mr. Chairman and gentlemen, I thank you most sincerely for the honor you have done me. I am a young man yet in the councils of the Association, and my selection for this place was a surprise to me. Lord Nelson's motto was, that "England expects every man to do his duty." You may expect that this England expects to do his duty as Secretary of the Section. (Applause).

THE CHAIRMAN: The next thing is new business.

MR. HALLBERG: Mr. Chairman, when I listened to that paper on drug adulterations a few minutes ago, it occurred to me we should have a reporter on the drug market, like we used to have years ago. It is only by accident that the Association is advised from year to year as to the various preparations on the market, and I would suggest, if the gentlemen share my views, that the present committee consider during the next year the feasibility or otherwise of having either a standing committee or a reporter on drug adulterations.

MR. KRAEMER: I rise to second that motion. A good many years ago the most valuable reports to this Association were those on the drug market, compiled by Dr. Squibb, and Dr. Rice, I believe; and I think this is one of the things most needed. It would do this Association and the retail pharmacists a great deal of good.

MR. HALLBERG: I mean that the Committee on Scientific Papers should take this matter into consideration and report on it next year—or, if it is desired to act on it now, I have no objection.

MR. OLDBERG: I hope Mr. Hallberg will make the motion to appoint a special committee now, to report at the next meeting—to be appointed by the chair.

MR. HALLBERG: I will put it that way, then, that a Committee on Drug Adulterations be appointed, to report next year.

MR. EBERT: I think it would be better to take Mr. Hallberg's suggestion under consideration for a year, and then we will not make a mistake. The American Pharmaceutical Association formerly had a Committee on Drug Adulterations, and also a Committee on the Drug Market. It strikes us all very favorably, and especially from the Chairman's paper we can see how necessary it is to keep in touch with what is going on, and it is possible this Section is the proper place for such a report, being the Scientific Section. As the Association at present has no Committee on Drug Adulterations or the Drug Market, might it not be well — as no doubt some of the members of this Section would carry on the good work for another year—to appoint a committee to consider what we want to introduce into this Section—whether we want to combine the report on the drug market and adulterations, or simply have a committee or reporter on adulterations, and let some other Section of the Association take up the drug market? We ought to have kept them up; there is no doubt about it.

MR. MAYO: As the motion now stands, it would meet Mr. Ebert's view that the Chairman of this Section be requested to appoint a Committee on Drug Adulterations, to report next year. If we simply allow this matter to rest until next year, and then take it up for consideration, we will have no more data than we have now. Therefore, it would be well to have this experimental report of the Committee, and then we will know what to do further.

The motion was put and carried.

THE CHAIRMAN: Is there any further new business?

MR. LYONS: I do not know whether it would come under the head of new business, but I want to know whether it is the wish of this Section that the Research Committee be continued. In the past it has been appointed from year to year.

Mr. Oldberg moved to continue, and the motion was seconded by Mr. Hallberg, and carried.

THE CHAIRMAN: If there is no further business, the next order of business is the reading of the Minutes.

Mr. Oldberg moved to dispense with the reading of the Minutes, and the motion was seconded by Mr. Hinrichs and carried.

MR. LYONS: Before we adjourn I should like to offer a resolution expressing our thanks to the very efficient officers who have given us this splendid result in scientific papers.

The motion was seconded by Mr. Ebert, and unanimously carried.

Upon motion of Mr. Puckner, the Section then adjourned.

The following is the full text of the three papers read in abstract by Mr. R. Fischer at the first session of the Section on Scientific Papers and referred to on page 246.

SANGUINARIA ALKALOIDS.

BY RICHARD FISCHER, MADISON, WIS.

Sanguinaria canadensis has been used for centuries by the Indians of North America as a medicine as well as a paint and dyeing agent, but its first mention in medical literature seems to have been made about 1802, by B. Smith,* who called attention to its emetic properties.

The first attempt at a chemical investigation of the drug was made by Downey, who in 1803, in an inaugural dissertation, reports the presence of a resin, a gum, and an extractive or saponaceous matter. Bigelow, examining the root in 1816, found "a peculiar resin of a deep orange color, a bitter principle, an acrid principle, fecula, and a fibrous or woody portion." F. Bird, in an inaugural dissertation (1822) published the results of a more complete analysis. He reports as constituents of the root, "cinchonine, extractive matter, gummy materials, resin, and gallic acid."

About 1824, a series of investigations were performed by Dana,† who isolated from the drug a substance of basic character, capable of forming blood-red salts, to which he gave the name "sanguinarina.". J. Schiel,‡ in 1842, prepared the same base by a different process, and later§ claimed its identity with chelerythrine, which Probst ‖ had prepared from Chelidonium majus.

In 1847 Riegel¶ prepared another base from bloodroot, which he considered identical with the porphyroxine that Merck had obtained from

* Collections for an essay toward a Materia Medica of the United States, 1801–1804.

† Journ. de Chim. medicale, 1828, Août, p. 384. Annals Lyceum of Nat. Hist., New York, 2, p. 245.

‡ Silliman's Journal, N. S., Vol. XX, p. 220; Ann. der Chem. u. Pharm., 43, p. 233.

§ Journ. für Prakt. Chem. (1856), 67, p. 61.

‖ Ann. der Chem. u. Pharm. (1839), 29, p. 113.

¶ Jahrb. f. Prakt. Pharm. (1847), 11, p. 100.

opium. It was not precipitated by ammonia, and yielded colorless bitter salts with acids.

Wayne,* preparing sanguinarine by Schiel's method, reported the presence of another alkaloid which could not be precipitated from ethereal solutions by acids. He describes it as a pale red amorphous substance, which became deep-red upon the addition of dilute hydrochloric acid. Gibb† proposed the name puccine for this substance, but Hopp‡ found that this "puccine" was nothing but impure sanguinarine.

The work of Naschold and Henschke on sanguinaria bases is enumerated below. The first investigator to furnish the proof§ that the substance indiscriminately termed sanguinarine and chelerythrine was no homogeneous body, but consisted of a mixture of at least three distinct alkaloids, was König,‖ who isolated from bloodroot an alkaloid which furnished bright yellow salts, a second whose salts were of a bright red color, while the third proved identical with the protopine that had been isolated from several other Papaveraceæ. To the first alkaloid König applied the name chelerythrine, the second he called sanguinarine. He also found another alkaloid, not precipitated from acid solutions by ammonia, which seemed identical with the β-homochelidonine of Selle. Tietz,¶ who continued König's work, was able to corroborate all of these results.

Schlotterbeck,** who investigated the composition of commercial "sanguinarine nitrate," comments on the misuse of the name chelerythrine as applied by König to an alkaloid which forms yellow salts, and proposes that the names chelerythrine and sanguinarine as used by König should be transposed, the former to refer to the red salt-forming base, the latter to the alkaloid which yields yellow salts, and which is present in bloodroot in far greater abundance. Although agreeing perfectly with Schlotterbeck's arguments, the author, to avoid confusion, has decided to use the above names as first applied by König and as known in recent chemical literature, until the proposed change be recognized by the United States Pharmacopœia or some other standard authority.

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* Am. Journ. of Pharm. (1856), 28, p. 521.

† Pharm. Journ. and Trans. (1860), II Series, 1, p. 458.

‡ Am. Journ. of Pharm. (1875), 47, p. 193.

§ It is of interest to note that as early as 1887, in a thesis for the degree of Graduate in Pharmacy, carried out at the University of Wisconsin under the direction of F. B. Power, F. W. Stecher mentions the isolation from bloodroot of an alkaloid with yellow salt-forming properties, but due to lack of time the investigation was not extended and never was published in any journal. An examination of the specimen in question, kept in the museum of the School of Pharmacy, showed that the investigators had in hand an almost pure article of König's chelerythrine.

‖ Inaug. Diss., Marburg, 1890.

¶ Inaug. Diss., Marburg, 1890.

** Proc. A. Ph. A. (1900), 48, p. 256.

EXPERIMENTAL.

10 Kilos of commercial bloodroot were coarsely powdered and exhausted by repeated digestion and expression, using approximately 2 per cent. acetic acid as a menstruum. A preliminary experiment to remove organic acids from the extract in the usual manner with lead acetate, showed that the colored alkaloidal salts were quantitatively precipitated with the lead sulphide, and could only partly be regained by boiling this precipitate with dilute acids. It was found, however, that upon addition of an excess of ammonia water to a part of the original acid extracts, a violet-colored gelatinous precipitate resulted, consisting, as afterwards shown, of chelerythrine, sanguinarine, and protopine, together with metallic salts, resin and coloring matter. The colorless filtrate, which gave a heavy precipitate with Mayer's reagent, still contained homochelidonine and part of the protopine.

The above separation of alkaloids with ammonia was now applied to the whole of the extract, the filtrate (subsequently referred to as A) slightly acidulated with acetic acid, and evaporated on the water-bath to the consistency of a thin syrup; while the precipitate (B) was purified by repeatedly dissolving in dilute acetic acid, filtering to remove resinous matter, and reprecipitating with ammonia.

The purified precipitate, dried on porous plates, consisted of a yellowish brown, strongly sternutatory powder. It was partly soluble in ordinary alkaloidal solvents, the alcoholic solutions being reddish-brown; the solutions in chloroform and acetone, yellowish; those in ether and benzol almost colorless, showing only a blue fluorescence. Since that part of the powder which was left undissolved by the ether proved to contain no alkaloids, the entire powder was extracted with ether in a Soxhlet extraction apparatus, and the ether allowed to evaporate. The residue presented a light brown, partly crystalline mass, which upon boiling with alcohol changed into a white crystalline powder (C), from which the mother-liquid was filtered off.

The crystalline mass (C) was dissolved in chloroform, in which it was readily soluble, this solution mixed with an equal volume of alcohol, and allowed to evaporate spontaneously. After a few days, fine colorless crystals had separated out among a mass of reddish crystals. By repeated recrystallizations from the same solvent and mechanical separation of the crystals, two distinct alkaloids could be obtained in a pure state: the one kind, comprising by far the greater amount, consisted of almost colorless crystalline crusts and yielded yellow salts with acids; the other, in the form of fine needles, yielded intensely red salts. The latter alkaloid, when still impure, frequently separated (especially from strongly chloroformic solutions) in the form of wart-like masses, often forming long chains, and closely resembling impure protopine. The m. p. of the two alkaloids (203° and 211°) as well as the color of their salts showed conclusively that they were the chelerythrine and sanguinarine of König.

By the slow evaporation of the alcoholic solution (D) some more impure sanguinarine and chelerythrine were obtained, besides some clear, colorless crystals which, recrystallized from a mixture of chloroform and alcohol, showed the typical crystalline forms of protopine. Their m. p. (204°) as well as their reaction with concentrated sulphuric acid, further showed their identity with this alkaloid.

The concentrated filtrate (A) was rendered alkaline with ammonia and shaken out repeatedly with chloroform; the chloroform residue taken up with dilute acetic acid, the solution filtered to remove resinous matter, then rendered alkaline with ammonia, and again shaken out with chloroform. The amorphous residue left upon evaporation of the chloroform was dissolved in hot acetic ether. Upon cooling, wart-like crystals separated out, melting at 200° and giving a violet color with concentrated sulphuric acid, besides crystals whose m. p. (155°) seemed to indicate β-homochelidonine. From the mother liquid more of the impure mixture of protopine and homochelidonine separated out, which was purified by dissolving in dilute acetic acid, precipitating with ammonia and shaking out with ether. The separation of the two alkaloids was accomplished partly by dissolving out the latter with acetic ether, in which protopine is only slightly soluble, partly by repeated crystallization and mechanical separation.

CHELERYTHRINE.

This name was first given by Probst * to an alkaloid discovered by him in Chelidonium majus, and was chosen because of its property to form salts of intensely red color. Later,† Probst reported the same base in Glaucium flavum. Prolex,‡ who investigated the constituents of celandine almost contemporaneously with Probst (in fact, a little earlier), gave the name pyrrhopine to the same base, which latter name, however, seems to have never come into general use.

As previously mentioned, Dana had found a basic substance in bloodroot, to which he gave the name sanguinarina, and which Schiel later declared identical with chelerythrine. Since this investigation, until within recent years, the names chelerythrine and sanguinarine were used synonymously in chemical and pharmaceutical literature, the latter name being generally preferred in this country, on account of the priority of Dana's work.

The first analyses of the base were also made by Schiel, but these, as well as those made by Naschold § and Henschke,‖ are of little importance

* Ann. der Chem. u. Pharm. (1839), 29, p. 113.

† Ann. der Chem. u. Pharm. (1839), 31, p. 241.

‡ Archiv. der Pharm. (1838), 26, p. 77.

§ J. für Prakt. Chem. (1869), 106, p. 385.

‖ Inaug. Diss. Marburg, 1886.

since it is apparent, from the methods of preparation as well as the properties ascribed to these substances, that the above investigators had in hand impure mixtures of several bases. Naschold as well as Henschke, for example, report a m. p. of 160–165° for their base, and call the color of the salts an orange-red. Although Henschke, on the strength of some color-reactions, had doubted the identity of chelerythrine from celandine with sanguinarine made from commercial sanguinarine, it required the above-mentioned investigations of König and Tietz to absolutely prove that commercial "sanguinarine" contained a mixture of at least three alkaloids. Later, Wintgen * succeeded in isolating from chelidonium residues an alkaloid identical in all its properties with the chelerythrine of König.

The chelerytherine isolated as above mentioned and purified by frequent crystallizations from acetic ether, consisted of colorless crystalline crusts, besides several clear, well defined rhombic crystals. When dry and seen in mass, the crystals, even in a highly purified state, showed a slight rose tint. The m. p., corresponding with König's results was 203° (uncorr.); Tietz gives 200°. The pure crystals are difficultly soluble in alcohol and acetic ether, readily soluble in chloroform. The solutions are colorless, but show a slight bluish fluorescence, decreasing with the purity. Exposed to air the crystals soon become covered with a yellow coating on the outside. To show that this color may be produced by the carbon dioxide of the air, and was not necessarily due to the presence of acids in the atmosphere of the laboratory, a current of carbon dioxide, washed by passing through a sodium carbonate solution, was passed over some chelerythrine contained in a tube. In a short time the crystals were colored yellow. Another sample, exposed for several hours to a current of carbonic acid-free air, remained perfectly colorless. The base is so sensitive to acids that a sample kept in a desiccator on which slightly rancid tallow had been used, soon turned yellow on account of the volatile fatty acids. The alkaloid should therefore be preserved in well-stoppered containers or in desiccators containing some strong base (caustic soda, unslaked lime). With dilute acids chelerythrine yields salts of a pure yellow color, of which those of inorganic acids are difficultly soluble in water, especially if an excess of acid is present.

Chelerythrine remains constant at 100°. Analyses of the desiccator-dried substance gave the following results: 0.1748 g. yielded 0.4482 g. $CO_2 = 69.92$ per cent. C., and 0.0916 g. $H_2O = 5.82$ g. H; 0.2385 g. yielded 0.6145 g. $CO_2 = 70.27$ per cent. C., and 0.1333 g. $H_2O = 6.21$ per cent. H.; 0.2230 g. yielded 0.5729 g. $CO_2 = 70.07$ per cent. C., and 0.1198 g. $H_2O = 5.97$ per cent. H. 0.2624 g. (according to Dumas) yielded 8.9 Cc. N at 15° and 746.8 mm. bar. pressure = 3.90 per cent. N; 0.1525 g. (according to Kjeldahls) yielded 0.00539 g. N = 3.537 per cent. N. (3.85 Cc. $\frac{N}{10}$ HCl were required).

* Inaug. Diss. Marburg, 1898.

Found.			Calculated for $C_{23}H_{23}NO_5$.		
C	H	N	C	H	N
69.92	5.82		70.23	5.85	3.56
70.27	6.21				
70.07	5.97				
—	—	3.90			
—	—	3.53			

The above formula, $C_{23}H_{23}NO_5$ was first proposed by König and later confirmed by Tietz and Wintgen. All of these investigators, however, found upon analysis of chelerythrine salts, figures which had to be referred to the formula $C_{21}H_{17}NO_4$ for the free base, whereupon they concluded that the free base contained alcohol, which could not be driven off. By heating the base with dilute hydrochloric acid, König was able to detect alcohol in the distillate, while Tietz concluded the presence of alcohol in the free base because of variable results in his methoxyl determinations. The formula of the free base, crystallized from an alcohol containing solvent, must therefore be written $C_{21}H_{17}NO_4 + C_2H_5OH$.

The attempt was made to obtain the alcohol-free alkaloid by using a non-alcoholic solvent. In a previous attempt to recrystallize chelerythrine, containing alcohol, from benzene (in which it is readily soluble), the solution had accidentally evaporated to dryness; upon readdition of benzene, a part remained undissolved. The mixture of substance and benzene was thereupon repeatedly evaporated to dryness on the waterbath, and the residue examined. It melted completely at 240°, but showed a slight change at 203°. It dissolved with difficulty in pure benzene, but quite readily upon the addition of a few drops of alcohol. The crystals which separated from this solution had the original m. p. of 203°, showing that probably some of the alcohol had been driven off with the benzene.

Pure chelerythrine, recrystallized from ethyl acetate, was now dissolved in very dilute hot hydrochloric acid, precipitated with ammonia, washed, and dried in a desiccator. The almost pure white powder, which melted at 257–264°, was recrystallized from hot toluene. Colorless crystals resulted, melting at 263–264° (uncorr.), and remaining constant even at 140°. Exposed to the air, they were only slowly colored yellow. Recrystallized from a mixture of acetic ether and alcohol, the resulting crystals again melted at 203°.

The crystals resulting from the toluene solutions were analyzed: I. 0.1808 g. yielded 0.4713 g. $CO_2 = 71.09$ per cent. C. and 0.0972 g. $H_2O = 5.97$ per cent. H; II. 0.1700 g. yielded 0.4405 g. $CO_2 = 70.67$ per cent. C. and 0.0920 g. $H_2O = 6.01$ per cent. H; III. 0.1965 g. (mixed in the tube with CuO) yielded 0.5111 g. $CO_2 = 70.94$ per cent. C. and 0.0990 g. $H_2O = 5.59$ per cent. H; IV. 0.2118 g. (as above) yielded 0.5486 g. $CO_2 = 70.64$ per cent. C. and 0.1041 g. $H_2O = 5.46$ per cent. H; V. 0.1637 g. (by the wet method acc. to Fritsch*) yielded

* Ann. der Chem. u. Pharm., 294, p. 79.

0.4255 g. CO_2 = 70.89 per cent. C. and 0.008964 g. N. (6.33 Cc. $\frac{N}{10}$ HCl were used) = 5.47 per cent. N; VI. 0.1545 g. (acc. to Kjeldahl) yielded 0.008302 g. N. (5.03 Cc. $\frac{N}{10}$ HCl were used) = 5.37 per cent. N.

Found.			Calc. for $C_{21}H_{17}NO_4$.			Calc. for $C_{21}H_{17}NO_4 + \frac{1}{2}H_2O$.		
C	H	N	C	H	N	C	H	N
71.09	5.97		72.62	4.90	4.03	70.78	5.06	3.93
70.67	6.01							
70.94	5.59							
70.64	5.46							
70.89	—	5.47						
—	—	5.37						

Although the analyses agree well enough with one another, they do not correspond to the formula $C_{21}H_{17}NO_4$ nor to $C_{21}H_{17}NO_4 + \frac{1}{2}H_2O$. The nitrogen content especially is much too high, probably due to the use of ammonia as a precipitant. Another portion of chelerythrine was therefore treated as before, except that sodium carbonate was used as a precipitant. The dried precipitate dissolved very readily in toluene, from which solution small, colorless crystals separated, melting at 257°. Heated to 100°, two samples lost 10.81 and 10.87 per cent. in weight; at the same time the odor of toluene was distinctly apparent. Calculated for $(C_{21}H_{17}NO_4)_2.H_2O + C_6H_5.CH_3$, 10.1 per cent.

The crystals dried at 100° to constant weight, were analyzed: I. 0.1720 g. yielded 0.4460 g. CO_2 = 70.72 per cent. C. and 0.0821 g. H_2O = 5.30 per cent. H; II. 0.1833 g. yielded 0.4767 g. CO_2 = 70.92 per cent. C. and 0.0876 g. H_2O = 5.31 per cent. H; III. 0.1746 g. yielded 0.4538 g. CO_2 = 70.88 per cent. C. and 0.0837 g. H_2O = 5.32 g. H; IV. 0.1636 g. (acc. to Kjeldahl) yielded 0.00609 g. N (4.35 Cc. $\frac{N}{10}$ HCl were used) = 3.72 per cent. N; V. 0.1570 g. (as before) yielded 0.00612 g. N (4.37 Cc. $\frac{N}{10}$ HCl were used) = 3.90 per cent. N; VI. 0.1470 g. (as above) yielded 0.00514 g. N (4.10 Cc. $\frac{N}{10}$ HCl were used) = 3.90 per cent. N.

Found.		
C	H	N
70.72	5.30	—
70.92	5.31	—
70.88	5.32	—
—	—	3.72
—	—	3.90
—	—	3.90

These results agree very well for the formula $(C_{21}H_{17}NO_4)_2.H_2O$, but in what manner the water is combined must for the present be left an open question. At 140°, even under greatly diminished pressure, the crystals failed to lose in weight. The absence of alcohol was proved by heating the substance with dilute hydrochloric acid and testing the distillate.

The attempt was now made to prepare alcohol-free chelerythrine by exposing the ordinary crystals to higher temperatures in a current of acid-free air. Upon heating 0.0448 g. of the substance at 120° in this manner for two hours, a loss of 0.0038 g. was noted. Upon exposure to the same temperature for four hours longer, a further loss of 0.0011 g. occurred. When finally the temperature was increased to 140–150° and this heat continued for seven hours, another decrease of 0.0025 g. resulted, a total loss of 0.0074 g., amounting to 11.7 per cent. Calculated for one molecule of alcohol, 12.0 per cent. The heated substance had turned slightly brown; its m. p. was 248°.

SANGUINARINE.

As above mentioned, the name sanguinarine was formerly used synonymously with chelerythrine, both referring to what we now know to be a mixture of several alkaloids. The commercial sanguinarine and its salts (prepared from bloodroot) are also nothing but such a mixture, still strongly contaminated with other impurities, König, who first succeeded in separating this mixture, applied the name sanguinarine to a well-characterized alkaloid, which melted at 211° and yielded salts of an intense red color.

The sanguinarine prepared as above described, corresponded in all respects with König's alkaloid. It differed from chelerythrine in the color of its salts, in m. p. and in the form of its crystals. While chelerythrine almost always crystallizes in the form of crystalline crusts, sanguinarine crystallizes from acetic ether in fine acicular bundles. In its pure state, sanguinarine is difficultly soluble in acetic ether, but can be successfully recrystallized from a mixture of chloroform and alcohol. From the latter solvent, the pure alkaloid separates in the form of needles, while the impure base often yields wart-like aggregates. The m. p. was found to be 211° (uncorr.), agreeing with König's results; Tietz reports 212–214°. Exposed to the air, sanguinarine assumes a red color, but much less rapidly than chelerythrine which contains alcohol. At 100° the alkaloid experiences no loss in weight.

König proposed $C_{20}H_{15}NO_4 + \frac{1}{2}C_2H_5OH$ as the formula for sanguinarine, while Tietz gives $C_{20}H_{15}NO_4 + H_2O$. The analysis of sanguinarine salts, made by these investigators, all agree with the formula $C_{20}H_{15}NO_4$ for the free base. König proved the presence of alcohol in his alkaloid in the same manner as with chelerythrine, while Tietz concluded the absence of alcohol from the close agreement of his methoxyl determinations. Since the melting-points also differ by several degrees, it seems possible that, depending upon the conditions, sanguinarine crystallizes either with alcohol or water. My analyses agree well with König's formula, $2C_{20}H_{15}NO_4 + C_2H_5OH$: I. 0.1438 g. yielded 0.3713 g. CO_2 = 70.42 per cent. C. and 0.0673 g. H_2O = 5.19 per cent. H; II. 0.1892 g. yielded 0.4894 g. CO_2 = 70.55 per cent C. and 0.0902 g. H_2O = 5.29 per cent. H.

Found.		Calc. for $2C_{20}H_{15}NO_4 + C_2H_5OH$.	
C.	H.	C.	H.
70.42	5.19	70.78 per cent.	5.05 per cent.
70.55	5.29		

HOMOCHELIDONINE.

In his examination of Chelidonium majus, Selle * found two alkaloids of the same composition, $C_{21}H_{21}NO_5$, but differing in their m. p. as well as their behavior toward general alkaloidal reagents. On account of their resemblance with chelidonine, which occurs in the same plant, he called them α and β homochelidonine. The α homochelidonine of Selle consists of large colorless crystals, melting at 182°, while β homochelidonine forms colorless monoclinic crystals with a m. p. of 159°. Both alkaloids were permanent at 100°.

König isolated from blood-root two kinds of crystals the analyses of which corresponded with the formula $C_{21}H_{21}NO_5$, but showed exactly the same behavior toward alkaloidal reagents. The one kind consisted of rhombohedrons, which softened at 158°, but did not melt completely until the temperature of 170° had been reached. They effloresced rapidly when exposed to the air, and lost 10.64–10.75 per cent. of their weight at 100°. In distinction from the β homochelidonine of Selle, König proposed the name γ homochelidonine for this base. From the mother liquor of the γ homochelidonine, a small quantity of crystals separated which agreed in every respect with Selle's β homochelidonine.

Tietz also examined homochelidonine from sanguinaria. He obtained from acetic ether solutions, depending upon the concentration, either large rhombic crystals melting at 159–160° and losing 11.18–11.50 per cent. in weight at 100°, or small rhombic prisms which showed the same m. p. but were constant at 100°.

Wintgen, who examined homochelidonine from chelidonium, concluded that β and γ-homochelidonine were identical, the crystalline form and m. p. depending upon the temperature and the nature of the solvent. Using acetic ether as a solvent, he obtained crystals which melted at 160–161° and were permanent at 100°. Recrystallized from alcohol, they melted at 169–170°, effloresced in the air and lost 5.97 per cent. in weight at 100°. The dried crystals being redissolved in acetic ether, crystals resulted which were identical with the original ones, but from the mother-liquid crystals were obtained which melted at 158° and lost 8.3 per cent. at 100°.

Homochelidonine was also found in Bocconia (Maclaya) cordata by Hopfgartner † and later by Murrill and Schlotterbeck.‡ Both report an

* Inaug. Diss., Erlangen, 1889.

† Monatshefte f. Chem. (1898), 19, p. 179.

‡ Proc. A. Ph. A. (1900), 48, p. 128.

alkaloid corresponding in all its properties with the β-homochelidonine of Selle. Hopfgartner's alkaloid melted at 159° but showed the peculiarity of solidifying at a few degrees below this temperature, when upon reapplication of heat a m. p. of 167° was noted. Murrill and Schlotterbeck give 158° corr. (155° uncorr.) as the m. p. of their pure base.

According to my investigations β and γ homochelidonine are probably physical isomers, differing in m. p. as well as in crystalline form, but capable of being converted one into the other. That the two are not identical is shown by the fact that they can crystallize out together from the same solution.

The still impure homochelidonine, prepared as above described anp melting at 159°, was purified by repeated crystallizations. In this manner thin prismatic crystals (*a*) were obtained, grouped into radiating masses, and melting at 168°, though showing a distinct softening at 158°. Dried at 100° they lost 10.97 per cent. in weight without changing their m. p. Upon heating in a closed vessel a distinct odor of acetic ether was apparent. Calculated for $2C_{21}H_{23}NO_5 + CH_3COOC_2H_5$: 10.66 per cent. The dried crystals were recrystallized from absolute alcohol. There resulted crystals which melted sharply at 169° and were constant at 100°, but from the mother liquid another kind of crystals with strongly curved faces was obtained which melted sharply at 159° and also showed no loss at 100°. The crystals which melted at 169° were dissolved in hot ordinary alcohol. Upon cooling, short, transparent prisms formed which effloresced rapidly in the air, even in closed vessels; m. p. 169°. The fresh crystals lost 5.97 per cent. in weight at 100°. Calculated for $2C_{21}H_{23}NO_5 + C_2H_5OH$: 5.89 per cent.

Upon slow evaporation of the mother liquid from (*a*), large, colorless crystals separated, which melted sharply at 159° and lost 10.7 per cent. in weight at 100°, whereby the odor of acetic ether was strongly apparent. The dried crystals, recrystallized from alcohol, melted at 169° and were constant at 100°.

Another portion of homochelidonine which melted at 158°, when recrystallized from hot acetic ether yielded large, well-developed crystals, melting sharply at 169°; no loss at 100°. Recrystallizing these from a more dilute acetic ether solution, large and small rhombic crystals resulted, partly liquefying at 159°, melting completely at 169°. No loss at 100°.

From the above, it will be noted that, depending upon the solvent as well as upon the concentration and temperature of the solution, it was possible to obtain, from apparently homogeneous material, five kinds of crystals, differing in m. p. as well as in content of alcohol or acetic ether of crystallization. The results are tabulated below:

Solvent.	M. P. uncorr.	Loss at 100°.
I. Acetic ether	(159°) 169°	10.97 per cent.
II. Alcohol	169°	None.
III. Alcohol	159°	None.
IV. Alcohol	169°	5.89 per cent.
V. Acetic ether	159°	10.7 per cent.
VI. Acetic ether	169°	None.
VII. Acetic ether	(159°) 169°	None.

Nos. I and VII, showing a softening at 159°, are probably mixtures.

The exact conditions under which the one or the other of these forms will appear was not determined, but work along this line will be continued. To determine whether the precipitant had any effect, some of the crystals described under [*a*] (sharp m. p. of 169°, no loss at 100°) were dissolved in dilute hydrochloric acid, precipitated with sodium carbonate and immediately shaken out with ether. From the ethereal solution well developed plates separated out, which were constant at 100° and melted completely at 159°. The observation was here made, however, that the melted mass again became crystalline at a few degrees below 159° and now showed a m. p. of 169°. Recrystallized from alcohol, the low melting form was obtained, showing the characteristic prisms with curved faces. M. p. 159°; no loss at 100°.

The attempt was now made to change the low melting into the higher melting form by fusion. In a previous experiment with Eschscholtzia homochelidonine* this had proved partly successful. Several decigrams of alkaloid were melted in a test-tube in a sulphuric acid bath and allowed to cool. A clear resin-like mass resulted which became crystalline upon the addition of alcohol. Dissolved by the aid of heat, unchanged crystals separated out. These were dissolved in dilute hydrochloric acid, the solution rendered ammoniacal and shaken out with chloroform. The amorphous chloroform residue, dissolved in alcohol, yielded two kinds of crystals: large clear plates, and the above-described prisms with curved faces. The former melted at 169°; the latter melted at 159° but upon solidifying showed the higher m. p. Neither lost in weight at 100°.

Two formulas have been proposed for β (and γ)-homochelidonine. Selle's formula of $C_{21}H_{21}NO_5$ was adopted by König, Tietz, and Murrill and Schlotterbeck. Wintgen proposed the formula $C_{21}H_{23}NO_5$, which Hopfgartner also arrived at. Tietz's results also agree better with the latter formula. My analyses of homochelidonine from Sanguinaria as well as from Eschscholtzia likewise agree well with the formula $C_{21}H_{23}NO_5$. Two analyses of γ-homochelidonine (sanguinaria), recrystallized from alcohol and dried at 100° gave results as follows: I. 0.1475 g. yielded 0.3690 g. $CO_2 = 68.23$ per cent. C. and 0.0844 g. $H_2O = 6.35$ per cent. H.; II. 0.1499 g. yielded 0.3758 g. $CO_2 = 68.37$ per cent. C. and 0.0865 g. $H_2O = 6.41$ per cent. H.

*Proc. A. Ph. A. (1901), 49, p. 441.

Found.		Calc. for $C_{21}H_{21}NO_5$.		Calc. for $C_{21}H_{23}NO_6$.	
C.	H.	C.	H.	C.	H.
68.23 p. c.	6.35 p. c.				
68.37 p. c.	6.41 p. c.	68.66 p. c.	5.72 p. c.	68.29 p. c.	6.23 p. c.

PROTOPINE.

The name protopine was first used by Hesse,* who applied it to an alkaloid he had discovered in opium, in 1870. In 1884, Eykmann † found an alkaloid in Bocconia (Maclaya) cordata, to which he gave the name maclayine. The identity of maclayine with protopine was first suggested by Schmidt ‡ and later proved by the researches of Hopfgartner § and of Murrill and Schlotterbeck. ‖ In 1890, Selle ¶ isolated protopine from celandine and furnished evidence of its presence in Stylophorum diphyllum.** Later, König found the same base in bloodroot. Dankwortt †† and Wintgen found an alkaloid in Eschscholtzia californica whose m. p. as well as color reactions corresponded with protopine, and Wintgen believed to have proved the existence of protopine in Glaucium flavum. The author's work on these plants ‡‡ showed these assumptions to have been correct. Trowbridge,§§ in 1899, prepared "fumarine" from Fumaria officinalis, and although the quantity obtained was too small to permit any analysis to be made, the m. p., color reactions and crystallographic measurements corresponded exactly with those of protopine, leaving no room for doubt as to their identity. Since then Schlotterbeck ‖‖ has also isolated protopine from another member of the Fumariaceæ, viz., Adlumia cirrhosa. Since all doubt concerning the identity of protopine and fumarine seems to be removed, a short resumè of the bibliography of fumarine is not out of place.

Peschier,¶¶ who first examined Fumaria officinalis, found in it a base which he considered identical with the corydaline that he had isolated from Corydalis cava. The name "fumarine" was first used by Hannon,*** who applied it to an alkaloid he had prepared from fumitory, probably

* Ann. der Chem., Ergänzungsband 8, p. 318.

† Rec. Trav. Chim., 3, 182.

‡ Archiv der Pharm. (1893), 231, p. 138.

§ Monatshefte f. Chem. (1898), 19, p. 179.

‖ Proc. A. Ph. A. (1900), 48, p. 128.

¶ Archiv der Pharm., 228, 456.

** Archiv der Pharm,, 228, 456.

†† Inaug. Diss. Marburg, 1890.

‡‡ Proc. A. Ph. A. (1901), 49, pp. 442 and 446.

§§ Private information.

‖‖ Proc. A. Ph. A. (1900), 48, p. 267.

¶¶ Trommsdorff, N. Journ. Pharm. (1829) Bd. 17, Th. 2, p. 80.

*** Journ. de Chim. Med. (1852), Ser. iii, T. 8, p. 705.

identical with the one found by Peschier. Preuss ‡ also prepared fumarine from the same plant, showed it to be distinct from corydaline, and mentioned its characteristic reaction with conc. sulphuric acid. The first analyses of fumarine were made by Reichwald,§ who proposed the formula $C_{21}H_{19}NO_4$, but as his results agree poorly with one another they cannot be regarded as reliable. Finally, Battandier ‖ has reported fumarine in Bocconia frutescens, Glaucium corniculatum, and in several Fumariaceæ: Fumaria, Petracapnos, Platycapnos, Sarcocapnos, Ceratocapnos, Corydalis, and Diclytra; although the only proofs this investigator gives are the reaction with sulphuric acid and, in a few cases, the appearance of the platinic salts, the presence of this base in these plants is very probable. Protopine (fumarine) is therefore the characteristic alkaloid of the papaveraceae and fumariaceae, having been found in every member of these families so far investigated.

As stated above, protopine crystallizes from chloroform-alcohol either as hemispherical wart-like aggregates, composed of individual fine needles, or as colorless, well-developed prisms of high refractive power. The latter can best be obtained by the slow spontaneous evaporation of comparatively dilute solutions. Protopine does not lose in weight at 100°. The m. p. of protopine obtained from three different sources by the author was found in all cases to be 206–207° (uncorr.) for pure, perfectly colorless crystals. The reactions with alkaloidal reagents were also identical in all three cases, corresponding with those given by Selle in the article mentioned above.

To further prove the identity of the protopine from sanguinaria with that from chelidonium, several well developed crystals were examined by A. Schwantke, who had previously measured protopine crystals from celandine for Wintgen. The crystals were found to be exactly identical, agreeing in their optical relations as well as in angular measurements.

Besides Reichwald's formula, mentioned above, two other formulas have been proposed for protopine: that of Hesse, $C_{20}H_{19}NO_5$, which agree with the results of Eykmann, Selle, Wintgen, Hopfgartner and Schlotterbeck, and $C_{20}H_{17}NO_5$ proposed by König and adopted by Tietz.

My analyses of protopine from Sanguinaria as well as that from Eschscholtzia and from Glaucium, agree best with Hesse's formula. The results for the alkaloid from bloodroot are as follows: I. 0.1542 g. yielded 0.3860 g. CO_2 = 68.27 per cent. C. and 0.0774 g. H_2O = 5.57 per cent. H; II. 0.1585 g. yielded 0.3958 g. CO_2 = 68.10 per cent. C. and 0.0779 g. H_2O = 5.46 per cent. H.

Found.		Calc. for $C_{20}H_{19}NO_5$.		Calc. for $C_{20}H_{17}NO_5$.	
C.	H.	C.	H.	C.	H.
68.28 p. c.	5.57 p. c.	67.98 p. c.	5.38 p. c.	68.37 p. c.	4.84 p. c.
68.10 p. c.	5.46 p. c.				

‡ Zeitschr. f. Chem., 1866, p. 414.

§ Pharm. Ztschr. f. Russland (1889), 28, p. 161.

‖ Comptes Rendus (1892), T. 114, p. 1122; and (1895) T. 120, p. 1276.

THE ALKALOIDS OF ESCHSCHOLTZIA CALIFORNICA.

BY RICHARD FISCHER, MADISON, WIS.

The first chemical investigations of the California poppy were made by Walz,* who reported besides other constituents, three alkaloids: 1. In the root, a grayish-white alkaloid which yields intensely red salts with acids; 2. In the herb, a white alkaloid, soluble in ether, almost tasteless, but forming salts of a very sharp and bitter taste; 3. In the root as well as in the herb, a bitter alkaloid, soluble in water, capable of being precipitated from concentrated solutions by ammonia, and yielding a violet color with conc. sulphuric acid.

In 1887, Martin,† reporting on clinical experiments with Eschscholtzia preparations, recommended them as a substitute for opium preparations; for a while they seem to have met with considerable favor but recently have fallen into disuse.

Bardet and Adrian‡ in 1888 published a paper on Eschscholtzia in which they reported the presence of morphine besides another body, a glucoside in character, precipitable by phosphomolybdate. As proofs of the presence of morphine they only gave a few color reactions. The interest awakened by this paper soon led to other investigations. In 1889, Reuter§ reports the finding of two alkaloids of which he only gives some color-reactions; neither of the bases however were identical with morphine. Dankwortt‖ was equally unsuccessful in finding morphine. On the strength of his work he concluded the presence of five alkaloids, only one of which however he was capable of isolating in a state of purity. On account of its m. p. (203°–204°) and its behavior toward general alkaloidal reagents he considered it identical with protopine.

Shortly afterwards Wintgen¶ took up the study of this plant. He succeeded in isolating protopine and β homochelidonine, both of which he identified by their m. p., as well as color-reactions; of the latter he also made an analysis of a gold salt. He further claimed to have found another alkaloid, melting at 224°, but the quantity isolated was so small that he could only apply a few color-reactions. Finally, Battandier** claimed to have found fumarine in California poppy, and later he reports the presence of considerable quantities of chelerythrine in the root of this plant, but as no m. p. nor analytical data are given and the author draws his conclusions entirely from a few color reactions, his results cannot be considered of much importance.

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* Jahrb. f. prakt. Pharm., 1844.

† Bull. Gén. de Thérap., 1887.

‡ Journ. de Pharm. et de Chémie (1888), T. 18, p. 525.

§ Pharm. Zeitung (1889), 34, p. 635.

‖ Inaug. Diss. Marbnrg, 1890.

¶ Inaug. Diss. Marburg, 1898.

** Comptes Rendus, 1892, p. 1122.

EXPERIMENTAL.

The material used in the following work consisted of the whole plant grown in the botanical garden at Marburg, Germany, collected during the flowering season and dried. The dried drug was coarsely comminuted, digested for several days with water acidulated with sulphuric acid and expressed, the residue being again treated in the same manner. The pale yellow solutions were filtered, precipitated with lead acetate, again filtered, and the excess of lead removed with hydrogen sulphide. Later experiments showed that considerable losses must result from the use of this method, since large quantities of alkaloids are carried down with the lead sulphide (chelerythrine and sanguinarine even quantitatively) and can be but imperfectly regained. Upon concentration of the filtrate from the lead sulphide precipitate, a large quantity of crystals separated out which proved to be potassium sulphate. The concentrated filtrate, of the consistency of a thin syrup, was made alkaline with ammonia and shaken out with chloroform. The united chloroform residues were in the form of a brown resin-like mass, only partly soluble in hot dilute hydrochloric acid. Taken up with the latter solvent and filtered from insoluble resinous matter, the acid solution was first shaken out with chloroform (A), whereby some alkaloids as well as most of the coloring-matter was taken out. After removing the chloroform from this solution by means of a current of carbon dioxide, it was rendered strongly alkaline with ammonia and then shaken out, first with ether (B), then with chloroform (C).

The residue after evaporation of the ethereal solution (B) represented a pale yellow varnish-like mass. Since all attempts at crystallization by means of various solvents failed, the mass was rubbed up with calcined magnesia and purified sand, and extracted with ether in a Soxhlet apparatus. Upon cooling of the ethereal extract, colorless, highly refractive bundles of crystals separated out, whose m. p., 205°, as well as whose reactions with conc. sulphuric acid showed them to be protopine. Upon evaporation of the ether another crop of protopine crystals separated, imbedded in a varnish-like matrix which could easily be removed by solution in acetone.

The acetone residue was now extracted with dilute acetic acid, the aqueous solution precipitated with sodium carbonate and immediately shaken out with ether. The ethereal residue taken up with acetic ether yielded bundles of white crystals, melting at 157°; these were added to the homochelidonine crystals mentioned below.

The chloroformic extract (C) which was strongly colored, was evaporated to a small volume and shaken out with acidulated (acetic acid) water, the pale-yellowish extract concentrated on a water-bath, rendered alkaline with ammonia and again shaken out with chloroform. After taking up this chloroform residue with dilute acetic acid, the solution was rendered alkaline with sodium carbonate and shaken out with ether. The almost

colorless ethereal residue was dissolved in acetic ether: this solution, upon spontaneous evaporation of the solvent, yielded colorless crystals, whose m. p., 157°, as well as other properties, proved them to be β-homochelidonine.

All attempts to obtain other crystalline bodies from the chloroform solution (A) proved futile. By treating with ether in a Soxhlet apparatus, as described under (B), a small amount of protopine was obtained. After removal of the protopine, the rest of the ethereal extract, together with a chloroformic extract of the material in the extraction apparatus, was divided into two portions, the one dissolved in alcohol the other in a mixture of alcohol and acetic ether. Both were now acidulated with gaseous hydrochloric acid in the hope of obtaining the crystals of Wintgen, described by him as melting at 224°: but even upon standing for weeks no precipitation occurred.

Likewise all attempts to obtain other crystallizable alkaloids from the ammoniacal mother-liquors after shaking out with chloroform (C) gave negative results. The alkaline solution, which still gave a precipitate with general alkaloidal reagents, was acidulated with hydrochloric acid, precipitated with Mayer's reagent, the precipitate collected, washed, suspended in water and after warming, decomposed by hydrogen sulphide. The mercuric sulphide was removed by filtration, the excess of hydrogen sulphide by heating, the solution shaken with freshly-precipitated silver chloride until free from soluble iodides, then concentrated, rendered alkaline with sodium carbonate and shaken out with chloroform. The chloroform residue dissolved in ether yielded only small quantities of yellowish crystals, the m. p. of which pointed to β-homochelidonine.

From none of the solutions had it been possible to isolate an alkaloid which would yield colored salts, although Walz speaks of such an one and Battandier reports the presence of large quantities of chelerythrine in the root. On account of the intense coloring power of chelerythrine salts, it was safe to conclude from the weak color of the acetic acid extract that these could be present in small quantities only, if at all, and might easily have been carried down with the lead sulphide.

To definitely settle the question of the presence of chelerythrine in California poppy, a few of the fresh flowering plants were first examined. The juice of the herb was perfectly colorless and that of the root was only slightly colored; a fresh cross-section of the latter, however, soon showed an orange-colored excretion which dissolved in dilute acetic acid to form an orange-red solution that yielded a precipitate with ammonia.

To isolate any chelerythrine present, a number of fresh as well as some dried roots were coarsely comminuted, macerated for a few days with alcohol, the alcoholic solution filtered and evaporated to a soft yellowish extract. This was taken up with dilute acetic acid, whereby much yellowish resin remained undissolved, and the filtrate rendered ammoniacal.

The weakly violet-colored precipitate was filtered off from the solution (still strongly yellow, probably because of chelidoxanthin present), dissolved in dilute acetic acid, the orange solution treated with an excess of sodium carbonate and shaken out with ether. Upon acidulating the ethereal solution with gaseous hydrochloric acid, an orange precipitate resulted which was dissolved in alcohol; this solution was allowed to evaporate spontaneously. Three kinds of crystals separated out: first, colorless crystals, probably protopine hydrochloride; second, pure yellow, probably the chelerythrine salt; third, orange needles, probably a mixture of the latter with some sanguinarine salt.

The presence of protopine as well as of β and γ homochelidonine in Eschscholtzia californica is conclusively proved by the work given below. The presence of chelerythrine and sanguinarine in small quantities must be regarded as highly probable. The absence of morphine in the plant can also be regarded as well established. Bardet and Adrian probably had in hand impure protopine.

ESCHSCHOLTZIA HOMOCHELIDONINE.

As stated above, Wintgen had isolated from Eschscholtzia a base the m. p. of which was 154°, and which he considered identical with β homochelidonine. The quantity obtained, however, was so small that he was able to make an analysis of the gold salt only; this agreed well for the base in question.

The β homochelidonine, isolated as described in the preceding pages, and having a m. p. of 157°, melted at 159° (uncorr.) after several recrystallizations; at 100° it showed no loss in weight. Recrystallized from alcohol (a) the typical prisms of β homochelidonine with curved surfaces were obtained (see article on sanguinaria alkaloids, this volume, page 434); m. p. 159°; no loss at 100°. The main quantity of homochelidonine, when isolated from Eschscholtzia according to the preceding method, is, therefore, β homochelidonine.

Here, as with β homochelidonine from sanguinaria, the substance melted sharply at 159°, became solid at a few degrees below this temperature, and now showed a m. p. of 169° (uncorr). Since it seemed probable that the lower melting base was converted into the higher melting one at this temperature, a small quantity was melted in a test-tube in a sulphuric acid bath, and allowed to cool. No loss in weight had taken place. The liquid had congealed into a resin-like, light-yellow mass, which became turbid upon the addition of alcohol. Dissolved in warm alcohol and allowed to cool, two kinds of crystals separated: 1, the original crystals with curved surfaces, melting at 159° and constant at 100°; 2, long, well-developed prisms, melting at 169° and becoming opaque upon heating, due to loss of alcohol of crystallization. About one-fourth of the total quantity of β homochelidonine had thus been changed into γ homochelidonine. To see

whether the quantitative conversion of the one into the other could not be accomplished by the prolonged application of heat, the above mixture was kept at 160–170° for one hour. The brownish mass dissolved in alcohol yielded crystals of β homochelidonine only.

From the mother liquid of (a) some long prisms in fan-like groups separated out besides the typical forms of β homochelidonine. Upon drying at 100° the mixture lost 3.5 per cent. in weight; at the same time the former crystals had become opaque, and could therefore be readily separated from the unchanged crystals of β homochelidonine. The pale crystals whose m. p. was 169°, were recrystallized from alcohol. The resulting crystals effloresced rapidly in dry air, on which account their crystallographic measurements, which were undertaken by A. Schwantke, had to be rapidly made. According to these determinations the crystals measured agreed well with those reported by Wintgen for homochelidonine obtained from Chelidonium. Since exactly the same combinations, as well as twin crystals, occurred in both, and their chemical properties were also alike, there can be no doubt as to their identity. In both cases we undoubtedly have to deal with γ homochelidonine.

Since β and γ homochelidonine can separate out side by side from the same solution, they cannot be regarded as identical. Both kinds are sharply characterized by their melting points, as well as their crystal form. The close relation between the two was shown by the author in quantitatively changing the γ to the β homochelidonine in the case of the sanguinaria alkaloid. The reverse change was partly successful in the experiment described above, although the exact conditions under which this change will take place have not yet been determined.

An analysis of a sample of β homochelidonine from Eschscholtzia gave the following results: 0.1540 g. yielded 0.3865 g. CO_2 = 68.44 per cent. C and 0.890 g. H_2O = 6.42 per cent. H.

Found.		Calc. for $C_{21}H_{23}NO_5$.	
C.	H.	C.	H.
68.44 per cent.	6.42 per cent.	68.29 per cent.	6.23 per cent,

ESCHSCHOLTZIA PROTOPINE.

Dankwortt, as well as Wintgen, isolated a base from Eschscholtzia, whose identity with protopine they suspected on account of the m. p., as well as some color reactions. No analyses of the base were made, however.

The protopine obtained by the author melted at 206–207° (uncorr.), when perfectly pure, and showed all the characteristic color reactions with general alkaloidal reagents. A. Schwantke, who examined some of the crystals, pronounced them identical with protopine crystals from Sanguinaria and Glaucium. An analysis yielded results as follows: 0.1571 g. yielded 0.3900 g. CO_2 = 67.84 per cent. C and 0.0790 g. H_2O = 5.58 per cent. H.

Found.	Calc. for $C_{20}H_{19}NO_5$.
C. 67.84 per cent.	C. 67.98 per cent.
H. 5.58 per cent.	H. 5.38 per cent.

THE ALKALOIDS OF GLAUCIUM FLAVUM.

BY RICHARD FISCHER, MADISON, WIS.

The earliest investigations of the alkaloids of Glaucium flavum, Crantz (Glaucium luteum, *Scop.;* Chelidonium glaucium, *L.*), a poppy indigenous to the coast districts of Southern and Central Europe, now cultivated to some extent in this country as a garden flower, were undertaken by Probst.* He describes three alkaloids isolated from this plant: 1, a pungent alkaloid derived from the herb, called by him *glaucine;* 2, from the root *chelerythrine;* 3, a bitter alkaloid, called by him *glaucopicrine,* also found in the root.

Glaucine was prepared by Probst by expressing the juice from the herb, treating this with lead salts, removing the excess of lead with hydrogen sulphide, and precipitating the alkaloid with a decoction of oak bark. The precipitate, while still moist, was treated with milk of lime and alcohol, the alcoholic solution freed from lime by means of carbonic acid and then evaporated to dryness, washing the residue several times with water. The crude alkaloid was dissolved in water, from which it separated in white crusts upon evaporation of the solvent.

As to the properties of glaucine, Probst mentions that it melts in boiling water, possesses a very sharp, bitter taste, and is readily soluble in water, especially when hot. Exposed to the air it turns reddish. Precipitated from acid solutions by ammonia, it forms a white curdy precipitate, which soon unites into a pasty mass, which upon standing becomes hard, at the same time turning darker in color. With acids it forms white salts of pungent taste. Heated with sulphuric acid, a beautiful indigo-violet color results.

The second alkaloid mentioned by Probst, *chelerythrine*, was isolated from the roots of the plant, but could not be found in the herb. He describes it as occurring in white, transparent crystals, which form a salt of intense red color with hydrochloric acid. Individual crystals of the salt appear yellow.

The *glaucopicrine* of Probst, which also was found in the roots only, is described by this investigator as forming a white, granular, crystalline mass of bitter taste, soluble in water and alcohol, less soluble in ether. Heated with sulphuric acid, glaucopicrine assumes a dark, grass-green color.

The next chemist who undertook the investigation of Glaucium flavum was Battandier. In his first article† on this subject he mentions a

* Ann. der Chem. u. Pharm. (1839), 31, p. 241.

† Journ. de Pharm. et de Chimie (1892) xxv, 350.

method for preparing the hydrobromic acid salt of glaucine, which he obtained crystalline by adding aqueous hydrobromic acid to an alcoholic solution of the free base. In another article * he states that pure glaucine yielded only a slightly bluish-green solution with cold concentrated sulphuric acid, the violet color appearing only upon heating.

Lastly, Wintgen † examined this plant, isolating therefrom an alkaloid which because of its melting point (206–207°) as well as on account of several color reactions, he regarded as protopine.

No analytical data are given in any of the above articles, so that the composition as well as the chemical nature of the glaucium bases are so far entirely unknown.

The plants examined by the author were grown in the Botanical Garden at Marburg, Germany, and gathered at the beginning of the flowering season, the roots being collected separately. The fresh stems, leaves and flowers were beaten in a mortar, digested for several days with water containing a little acetic acid, then expressed, and the residue again treated as before. The combined aqueous extracts, which were almost colorless, were treated with ammonia, and the resulting precipitate, consisting mostly of calcium, magnesium and iron salts, and being entirely free from alkaloids, allowed to subside. The clear supernatant liquid was decanted, slightly acidulated with acetic acid, and then evaporated on a water-bath to the consistency of a thin syrup. During the latter operation a dark precipitate (N) separated, which was filtered off and treated as described below.

The addition of ammonia to the filtrate from (N) caused a precipitate, which was collected on a strainer (filtrate A), washed several times with water, and then treated with dilute hydrochloric acid. A white granular mass resulted, which dissolved upon heating but again separated upon cooling (B). After washing with a little cold water, it was dissolved in hot water, the solution treated with ammonia and shaken out with chloroform. The residue left upon evaporation of the chloroform was dissolved in acetic ether, from which solution well-developed rhombic crystals separated, which melted at 115° and were slightly soluble in water. Heated with water they melted into oily drops which redissolved upon the addition of a little hydrochloric acid. The latter solution when cooled and treated with sodium carbonate yielded a curdy precipitate which rapidly united to a dirty mass. From this behavior its identity with the glaucine of Probst seemed highly probable.

The filtrate from (B) was rendered ammoniacal, whereby a brown precipitate (C) resulted, which was dried and treated with chloroform in which it was partly soluble; the insoluble portion proved upon examination to be free from alkaloids. The chloroform-residue was taken up

* Comptes Rendus, 1895, T. 120, p. 1276.

† Inaugural Diss. Marburg, 1898.

with very dilute hydrochloric acid and shaken out with chloroform, first in acid (C*a*), then in ammoniacal solution (C*b*). The residues from both were dissolved in alcohol. The alkaline filtrate from *C* was shaken out with chloroform and the chloroform-residue treated as under (C). The acid chloroform solution resulting herefrom was colored reddish-brown, the alkaline solution, green. The alcoholic solutions of the chloroform residues will be referred to later as (D*a*) and (D*b*) respectively.

From (C*b*) and (D*b*) strongly colored crystals separated, which were regarded as protopine on account of their melting-point as well as their form and solubilities.

Upon evaporation of (C*a*) and (D*a*) white silky needles separated out, which were soluble in water and the aqueous solutions of which gave precipitates with silver nitrate and with sodium carbonate. These reactions, as well as the fact that they had been shaken out of hydrochloric acid solutions, led to the conclusion that the substance was a hydrochloric acid salt. Treated with acetone, the crystals were freed from adhering resinous impurities and collected on a filter. Since they were precipitated from their aqueous solutions by hydrochloric acid in the form of fine needles, this method was adopted for their purification. The perfectly white purified salt was finally dissolved in water and this solution treated with sodium carbonate. There resulted a white curdy precipitate which partly aggregated into a soft pinkish mass, partly floated throughout the liquid in colorless oily drops. It was also found that a large excess of alkali was necessary to accomplish complete precipitation, so that a saturated solution of potassium carbonate was used to this end. The precipitated alkaloid, which was almost pure glaucine, was taken up with ether, in which it was readily soluble. The mother liquids, from which the above glaucine hydrochloride had separated, gave an abundant jelly-like precipitate with a concentrated solution of sodium carbonate. All attempts to obtain it in the form of crystals by the use of various solvents and mixtures of solvents were for a long time futile. The very slow evaporation of a solution in acetic ether to which a few drops of alcohol had been added, resulted in obtaining a crystalline mass, but no distinct crystals. The best results were obtained by using the following method, which from now on was always employed in purifying glaucine:

The impure glaucine is dissolved in water slightly acidulated with hydrochloric acid, the brown solution rendered strongly alkaline with sodium carbonate and then shaken out with ether, which dissolves all of the alkaloid, but very little coloring matter. The pale yellow ethereal solution is concentrated to the consistency of a thin syrup and allowed to evaporate spontaneously in a long-neck flask. Large, well-developed crystals of but slightly brown color separate out, which, upon recrystallizing several times from ether, are almost colorless. The purified crystals form transparent, highly-refractive prisms and plates, often several centimeters in length; m. p. 119°–120°.

Filtrate (A) was shaken out with chloroform, the chloroform residue taken up with dilute hydrochloric acid, the solution filtered, rendered alkaline and shaken out with ether. After distilling off the ether, the amorphous residue was dissolved in acetic ether. Upon evaporation of this solution, nearly colorless crystals separated out, which melted at 205° and gave a violet color with sulphuric acid. Upon recrystallizing from a mixture of chloroform and alcohol, the characteristic prisms, as well as the wart-like forms of protopine were obtained. From the mother-liquid of the acetic ether solution more protopine separated out, besides some crystals which melted at 115° and were readily soluble in acetic ether. By repeatedly evaporating to dryness and treating the residue with acetic ether, the last traces of the less soluble protopine were removed and the rest, which proved to be impure glaucine, purified in the manner described above.

Precipitate (N) also contained a mixture of protopine and glaucine, which was evaporated and purified as above.

The roots of the plant were extracted in the same manner as the herb and the acid aqueous extracts concentrated on the water-bath. Upon addition of ammonia a precipitate (F) resulted which was washed with water and then treated with hydrochloric acid, whereby a large portion became crystalline. The crystalline mass was dissolved in hot water, precipitated with ammonia, the precipitate (G) collected and dried. After extracting this with chloroform and evaporating off the solvent, the amorphous residue was dissolved in alcohol, from which crystals of protopine soon separated out. The alcoholic mother-liquor was evaporated to dryness, the residue taken up with dilute acetic acid, the solution filtered, treated with an excess of sodium carbonate and shaken out with ether. Upon dissolving the almost colorless ethereal residue in a mixture of chloroform and alcohol another abundant yield of protopine was obtained.

The filtrate from (F) was shaken out with chloroform, which upon evaporation left a crystalline residue. Upon treatment with alcohol very little of the crystalline mass was dissolved, while almost all of the coloring matter went into solution. Upon recrystallizing the crystals several times from chloroform alcohol, perfectly colorless crystals were obtained the m. p. of which (206–207°) and reactions with conc. sulphuric acid showed them to be protopine. The filtrate from (G) also yielded a small amount of protopine.

In spite of the utmost care, it had been found impossible to detect chelerythrine in any part of the extract, though Probst mentions its presence in the root. Since small portions of this alkaloid might have been decomposed during the operations, a quantity of the fresh plant was examined with the special view of determining its presence or absence.

The juice of the herb as well as of the root is perfectly colorless, but a cross-section of the latter showed a pale yellow zone which turned reddish

when exposed to the air. The fresh roots were extracted with alcohol, the alcohol removed by evaporation, the residue taken up with dilute acetic acid, the solution filtered and treated with ammonia. The resulting pale-violet precipitate was collected, washed, dissolved in dilute acetic acid and the orange solution precipitated with sodium carbonate and immediately shaken out with ether. Through the ethereal solution, which showed a bluish fluorescence, gaseous hydrochloric acid was passed. An orange-colored precipitate formed which, upon decanting the ether, was dissolved in alcohol and this solution allowed to evaporate spontaneously. Three kinds of crystals separated out: some colorless (which were probably protopine hydrochloride) as well as some yellow and other orange-red needles. Judging by the color, the second were probably chelerythrine; the last a mixture of this with some sanguinarine salt. The quantity obtained, however, was so small as to preclude all further attempts at characterization.

Neither filtrate (A) nor the filtrate from precipitate (F) yielded homochelidonine, so that it appears as though the glaucine takes the place of this alkaloid which occurs in so many other members of the poppy family. The alkaloids existing in glaucium flavum may be put down as follows: In the herb alone, *glaucine;* in the root as well as the herb, *protopine;* in the root alone (probably), *chelerythrine* and *sanguinarine.*

GLAUCINE.

Probst's description of this alkaloid is that of a very impure base.

The very pure alkaloid obtained by the slow evaporation of an ethereal solution, as above described, consisted of clear, well-developed, highly-refractive prisms and plates of a very slight yellow tint. They were often of considerable size but so soft that it was found difficult to remove them uninjured from the crystallizing flask.

The crystallographic examination of the crystals, carried out by A. Schwantke, gave the following results:

Crystallographic system, rhombic.

Relation of axes, a : b : c = 0.57970 : 1 : 0.2718.

The crystals show the combination *b* (010), *m* (110), *d* (011), plates toward *b* and extended in the direction of the *c* axis.

Plane of optical axes, *b;* first middle line, *a;* large angle between axes.

The melting-point of pure glaucine is 119–120° (uncor.). Powdered glaucine softens in boiling water and forms a yellowish, sticky mass, but does not melt completely. It is only slightly soluble in cold water, somewhat more in hot water. Difficultly soluble in benzene and toluene, much more soluble in ether and very soluble in alcohol, acetic ether, acetone and chloroform. With acids, the alkaloid forms salts which are readily soluble in alcohol and water. When pure, these as well as the free alkaloid are quite stable, but impure specimens, especially when in solution, soon turn

reddish-brown. Since this is also the color produced by the action of oxidizing agents, the above change is probably due to the oxidizing action of the air. Glaucine, as well as its salts, should preferably be kept in well-stoppered containers, protected from light. Pure glaucine is tasteless; the hydrochloride and hydrobromide have a slightly bitter taste.

Glaucine is a very weak base. This was shown above by the fact that a large excess of alkali carbonate was necessary to produce complete precipitation. The resulting precipitate is at first white and curdy, but soon forms oily drops or tough, elastic lumps. Upon shaking a hydrochloric acid solution of the base with chloroform, the salt goes into the chloroform. This property may be utilized for separating mixtures of glaucine and protopine. In aqueous solutions, the salts of glaucine have a neutral reaction toward indicators. If, however, the hydrochloric acid salt is dissolved in chloroform, in which it is readily soluble, the solution has an acid reaction.

Glaucine is optically active, turning the plane of polarized light to the right. A solution in alcohol, which contained 5.0449 g. of the alkaloid in 100 Cc., gave a reading of $+ 11° 27'$, l being 200 mm. From this is calculated $[L]_d = + 113.3$. Diluting the above solution with an equal volume of alcohol, $[L]_d = 114.1$; the reading, using a 200 mm. tube, was $+ 5° 46'$.

With mercuric chloride T. S., solutions of glaucine hydrochloride yield white precipitates; those produced by gold and platinic chloride solutions have a reddish color. Attempts to crystallize the gold and platinum salts proved futile. The amorphous precipitates dissolved in warm dilute alcohol, but upon cooling separated out again in resinous masses, together with some of the reduced metals. After several attempts, a crystalline mercury salt in the form of colorless needles was obtained from a strongly alcoholic solution. Its melting point was not sharp, lying between 130°–140°.

Glaucine gives very delicate and characteristic reactions with general alkaloidal reagents.

With cold conc. sulphuric acid a small crystal of free glaucine turns pale yellow, dissolving to form colorless solutions. Upon standing in a desiccator for several hours, this solution assumes a light blue color. This coloration goes on more rapidly and is more intense when the solution is heated, in which case the color soon changes to a very stable dark blue to violet. Diluting the latter with water, a brownish-red solution results, which gives a blue precipitate with ammonia. This precipitate assumes a dirty reddish-brown color upon the addition of dilute acids, but does not dissolve.

Upon dissolving glaucine in conc. sulphuric acid, and adding a trace of potassium dichromate, a green color results, which soon changes to a dirty brown.

If a crystal of glaucine is treated with concentrated nitric acid, a violent reaction occurs, the crystal assuming a green color for a moment, then dissolving to form a reddish-brown liquid. If dilute nitric acid is used, the solution is colorless at first, but soon begins to change, finally becoming reddish-brown.

Toward Froede's reagent (prepared by dissolving 0.01 g. sodium molybdate in 1.0 Cc. of conc. sulphuric acid), glaucine shows the following behavior: Passing green, then blue to deep indigo. Kept in a desiccator for fifteen minutes, the solution shows a violet coloration at the border. After half an hour a dark blue spot at the centre alone remained; surrounding this the solution was lighter, then came a violet ring, and finally at the border a brownish coloration. After 16 hours the solution was colored a pale violet; after 24 hours it was slate colored.

Treated with Mandelin's reagent (0.005 g. ammonium vanadate in 1.0 Cc. conc. sulphuric acid) the following changes of color were observed: The solution first turned light, then dark-green. After fifteen minutes it became dark blue at the centre and violet toward the border; after another fifteen minutes the border had turned reddish-brown. After 16 hours the whole solution is colored a beautiful violet. Exposed to moist air, the color rapidly changes to reddish-brown.

If a trace of glaucine is dissolved in Erdmann's reagent (6 drops of nitric acid, sp. gr. 1.25 were mixed with 100 Cc. of water and 10 drops of this solution added to 20 Cc. of pure conc. sulphuric acid), the solution is first colored light blue, then assumes a Prussian blue tint, and after half an hour has a greenish-blue color. This latter color is very stable.

Dissolved in dilute hydrochloric acid, glaucine neither reduces ferric chloride nor potassium iodate.

With the general alkaloidal precipitants, glaucine gives quite delicate tests:

Reagent.	Dilutions.		
	1 : 1000	1 : 10,000	1 : 100,000.
Potassium mercuric iodide	white prec.	faint white prec.	faint cloudiness.
Iodine in pot. iodide sol.	brick-red prec.	faint red prec.	reddish turbidity.
Potassium bismuth iodide	brick-red prec.	faint red prec.	reddish turbidity.
Potassium cadmium iodide	white prec.	faint white prec.	no reaction.
Tannin	gray prec.	gray prec.	cloudiness.
Phosphomolybdic acid	white prec.	cloudiness.	no reaction.
Phosphotungstic acid	white prec.	cloudiness.	no reaction.

In dilutions of 1 : 1,000,000, none of the above reagents caused any visible change.

At 100° glaucine does not lose in weight, but is colored slightly brown,

on which account the dessicator-dried alkaloid was used in the following analyses: I. 0.1688 g. yielded 0.4389 g. CO_2 = 70.91 per cent. C. and 0.1134 g. H_2O = 7.46 per cent. H.; II. 0.1678 g. yielded 0.4355 g. CO_2 = 70.78 per cent. C. and 0.1091 g. H_2O = 7.22 per cent. H.; III. 0.1619 g. yielded 0.4204 g. CO_2 = 70.82 per cent. C. and 0.1048 H_2O = 7.19 per cent. H.; IV. (combustion by the wet process according to Fritsch*), 0.1596 g. yielded 0.4162 g. CO_2 = 71.12 per cent. and 0.00630 g. N. (4.50 Cc. $\frac{N}{10}$ HCl being used) = 3.94 per cent. N.; V. 0.1642 g. (combustion as preceding) yielded 0.4282 g. CO_2 = 71.12 per cent. C. and 0.00644 g. N. (4.60 Cc. $\frac{N}{10}$ HCl used) = 3.99 per cent. N.; VI. 0.1554 g. (mixed with CuO in the tube) yielded 0.4045 g. CO_2 = 70.99 per cent. C. and 0.0994 g. H_2O = 7.10 per cent. H.

	Found.					
	I.	II.	III.	IV.	V.	VI.
C.	70.91 p. c.	70.78 p. c.	70.82 p. c.	71.12 p. c.	71.12 p. c.	70.99 p. c.
H.	7.46 p. c.	7.22 p. c.	7.19 p. c.	——	——	7.10 p. c.
N.	——	——	——	3.94 p. c.	3.92 p. c.	——

These results can best be referred to the formula $C_{21}H_{25}NO_4$, which requires *C.* 70.99 per cent.; H. 7.05 per cent.; N. 3.94 per. cent.

GLAUCINE HYDROCHLORIDE.

If impure glaucine is dissolved in dilute hydrochloric acid by the aid of heat, most of the salt separates from this reddish solution upon cooling in the form of fine white needles, mostly grouped into bundles. If these are collected on a filter and washed with a little alcohol, they are pure white in color, but upon drying they shrivel up into a reddish, horny mass. This mass was dissolved in a little hot alcohol and mixed with twice its volume of acetic ether, in which latter solvent the salt is practically insoluble. Upon cooling and upon subsequent slow evaporation, pure glaucine hydrochloride separated out in the form of white, silky needles. Other attempts to obtain the crystalline salt gave poor results. If gaseous hydrochloric acid is passed into an ethereal solution of glaucine a jelly-like precipitate results, which dissolves upon the addition of alcohol. Upon evaporation of this solution only an amorphous residue remains. A solution of glaucine in absolute alcohol was acidulated with hydrochloric acid gas and then a layer of ether poured upon it; however, no crystals separated upon standing.

Pure glaucine hydrochloride dissolves readily in water and alcohol to form colorless solutions, which gradually become reddish-brown upon exposure to the air, especially in sunlight. Hydrochloric acid precipitates it from ts concentrated aqueous solutions.

Heated to 100°, the air-dried salt loses 11.5 per cent. of its weight,

* Ann. der Chem. u. Pharm., 294, p. 79.

corresponding to three molecules of water of crystallization, without however changing its color: I. 0.2038 g. lost 0.0237 g. = 11.6 per cent.; II. 0.2278 g. lost 0.0260 g. = 11.4 per cent. Calculated for $C_{21}H_{25}NO_4.HCl + 3H_2O$ = 11.2 per cent. The melting point of the crystals after drying at 100° was 233° (unc.), but at 220° they already commenced to turn green and shriveled up considerably before melting.

The chlorine determination of the dried salt was accomplished by dissolving the substance in water, adding a few drops of dilute nitric acid and finally a slight excess of silver nitrate solution. The precipitated silver chloride was collected and weighed in the usual manner. I. 0.1801 g. yielded 0.0642 g. AgCl = 0.0163 g. HCl = 9.06 per cent. HCl; II. 0.2018 g. yielded 0.0715 g. AgCl = 0.0181 g. HCl = 9.01 per cent. HCl. Calculated for $C_{21}H_{25}NO_4.HCl$ = 9.19 per cent.

GLAUCINE HYDROBROMIDE.

This salt was prepared by dissolving glaucine in alcohol, adding a slight excess of strong aqueous hydrobromic acid and then acetic ether until a heavy precipitate appeared, composed of minute crystals. This precipitate was filtered and the reddish mass recrystallized from hot alcohol. Pale pinkish crystals separated upon cooling. They were constant at 100°, but readily became colored reddish-brown in hot alcoholic solutions, probably due to partial decomposition; by the addition of a little animal charcoal, the solutions as well as the resulting crystals can be obtained colorless. At 210° the crystals turn green; above that temperature they shrivel up and finally form a green liquid at 235°. The hydrobromide of glaucine is much less soluble in water and alcohol than the corresponding hydrochloric acid salt.

Two bromine determinations of the substance were made, carried out in the same manner as with the hydrochloride. In one of these determinations brownish crystals separated out while waiting for the silver bromide to settle. These crystals, which were probably glaucine nitrate, dissolved upon warming, but did not separate out again after filtering.

I. 0.2130 g. yielded 0.0916 g. AgBr = 18.49 per cent.; II. 0.2068 g. yielded 0.0887 g. AgBr = 18.49 per cent. Calculated for $C_{21}H_{25}NO_4.HBr$ = 18.58 per cent. One combustion of the salt was made, using lead chromate: 0.1620 g. yielded 0.3416 g. CO_2 = 57.51 per cent. C., and 0.0878 g. H_2O = 6.02 per cent. H. Calculated for $C_{21}H_{25}NO_4.HBr$: C, 57.79 per cent.; H, 5.96 per cent.

ACTION OF METHYL IODIDE UPON GLAUCINE.

1.0 g. glaucine was dissolved in 4.0 Cc. methyl alcohol and this solution mixed in a pressure bottle with an excess of methyl iodide. Upon standing for several hours at room temperature, a considerable quantity of almost colorless crystals separated out, which after 24 hours were filtered off,

washed several times with methyl alcohol and recrystallized from the same solvent. The nearly colorless crystals were constant at 100°, turned slightly brown at 210°, and melted at 216°. They were fairly soluble in hot water as well as in hot alcohol; they also dissolved in chloroform, but this solution rapidly turned yellow in the air.

An iodine determination was deemed sufficient for the characterization of the substance, 0.2093 g. of the substance yielded 0.0990 g. AgI = 0.05349 I = 25.56 per cent. Calculated for $C_{21}H_{25}NO_4.CH_3I$ = 25.55 per cent.

To determine whether glaucine was a secondary or tertiary base, a part of the compound was dissolved in hot water, and this solution treated with sodium carbonate. Upon cooling, highly refractive crystals separated out, which by their melting point were identified as the original substance. The alkaline mother liquid was first shaken out with ether, which did not take up anything, and then with chloroform. Upon evaporation of the chloroform a brownish residue remained, which was soluble in water, of a neutral reaction, and gave a precipitate of AgI with $AgNO_3$ solution. Recrystallized from methyl alcohol, slightly brownish crystals of the original methyl iodide compound resulted. Glaucine, therefore, is a tertiary base, and the above compound, $C_{21}H_{25}NO_4.CH_3I$, is glaucine methyl iodide.

METHOXYL DETERMINATION.

These determinations were carried out according to Zeisel's method, but with a somewhat modified apparatus. Shortly after heating the glaucine and hydriodic acid, the silver nitrate solution in the first of the Drexel's bottles became cloudy, and after the completion of the operation an abundant precipitate of the white crystalline compound of silver iodide with silver nitrate had separated out. The silver iodide was separated from this in the usual manner and weighed. In the first two determinations small losses of silver iodide occurred; the third determination proceeded normally. I. 0.2090 g. yielded 0.5231 g. AgI = 0.069 g. (OCH_3) = 33.13 per cent. (OCH_3); II. 0.2470 g. yielded 0.6378 g. AgI = 0.08442 g (OCH_3) = 34.18 per cent. (OCH_3); III. 0.1764 g. yielded 0.4686 g. AgI = 0.06181 g. (OCH_3) = 35.16 per cent. (OCH_3). Calculated for 4 methoxyl groups, 34.93 per cent. The formula of glaucine may, therefore, be written $C_{17}H_{13}(OCH_3)_4N$, and glaucine may be considered the tetramethylester of the compound $C_{17}H_{17}NO_4$.

In carrying out the above determinations, the glaucine first dissolved in the hydriodic acid upon warming, but soon fine, white, shining needles separated out. After the completion of the reaction, these were gathered on a filter and washed with alcohol until they showed only a faint yellow color. So purified, the crystals melted with decomposition at 225–235°. They were readily soluble in water, less so in alcohol; both of these solutions soon became colored on exposure to the air. During an attempt to

recrystallize the substance from hot water, the solution first turned green, then brown. Upon evaporation of the solvent, some well-developed, dark-reddish crystals were obtained, which also melted between 225° and 235°. To identify the body, an iodine determination was resorted to. On account of the strong reducing action of the substance, the precipitation had to be conducted in hot solutions, strongly acidulated with nitric acid.

0.1580 g. of the substance yielded 0.0866 g. AgI = 0.46801 g. I = 29.62 per cen. Calculated for $C_{17}H_{13}(OH)_4N.HI$ = 29.74 per cent. The above body, therefore, is the hydriodic acid salt of the base $C_{17}H_{13}(OH)_4N$, of which glaucine is the tetramethylester.

GLAUCIUM PROTOPINE.

The protopine isolated from Glaucium in the manner described above, differs in no respect from the protopine obtained from Sanguinaria and from Eschscholtzia. Probably, on account of less resin-like impurities, the Glaucium base could more readily be obtained in the form of well-developed crystals than in the case of the other two. On the other hand, these crystals were strongly colored, sometimes almost black, and could only be obtained colorless by frequent recrystallizations.

The m. p. of the pure base was 206–207° (uncorr.) At 100° no loss of weight resulted. For further identification some of the crystals were crystallographically examined by A. Schwantke, who pronounced them identical with the protopine from other sources.

Three analyses were made: I. 0.1574 g. yielded 0.3917 g. CO_2 = 67.87 per cent. C. and 0.0810 g. H_2O = 5.71 per cent. H.; II. 0.1486 g. yielded 0.3713 g. CO_2 = 68.14 per cent. C. and 0.0756 g. H_2O = 5.65 per cent. H.; III. 0.1709 g. (according to Kjeldahl) yielded 0.00612 g. N. (4.83 Cc. $\frac{N}{10}$ HCl were used) = 3.93 per cent.

	Found.		Calc. for $C_{20}H_{19}NO_5$.
C. 67.87 p. c.	68.14 p. c.	——	C. 67.98 p. c.
H. 5.71 p. c.	5.65 p. c.	——	H. 5.38 p. c.
N. ——	——	3.93 p. c.	N. 3.96 p. c.

In conclusion, the author desires to express grateful acknowledgement to Prof. E. Schmidt, in whose laboratory the above researches, as well as those on Sanguinaria and Eschscholtzia were conducted, for his kindly interest in the work and for valuable suggestions furnished.

MINUTES

OF THE

SECTION ON EDUCATION AND LEGISLATION.

FIRST SESSION—FRIDAY AFTERNOON, SEPTEMBER 20, 1901.

The first session of the Section on Education and Legislation was convened at 3:40 p. m., with Chairman C. B. Lowe presiding.

Mr. Eberle, of Texas, was called to the chair while the Chairman's Address was delivered.

The address was as follows:

CHAIRMAN'S ADDRESS.

To the Section on Pharmaceutical Education and Legislation of the American Pharmaceutical Association:

Gentlemen: Since last we met, some interesting events have taken place in the world that have been of marked interest to pharmacists. One of the most important of these was the repeal of the Internal Revenue Tax upon proprietary articles. This tax, which bore hard upon the retail pharmacist, because it diminished his already too small profits, was considered by many of us as being a somewhat unrighteous tax, because certain industries had been singled out for taxation, and many others which could have borne the tax just as well allowed to go free. We are glad that the American Pharmaceutical Association, through its membership and Committee on National Legislation, have borne so prominent a part in its repeal.

We think that this should be made an occasion for uttering words of praise to those proprietors who themselves assumed the burden of taxation. All honor to them for their kindness: we hope that the good will that this must have aroused has been crystallized into tangible dollars and cents. If praise is due to this class, what shall we say of those manufacturers who compelled the pharmacist to bear the war tax, or of that more reprehensible class who made the institution of the tax an occasion for advancing the price of their preparations *beyond the amount of the tax*. In the case of those who advanced their prices, it would seem that the least that they can now do, would be to promptly resume their old prices. In quite a number of cases this has been done, but in other cases the war prices are still retained. I would recommend that we pass resolutions stating the view that we take of the miserly greed exhibited by this latter class, and that these resolutions be communicated to the N. A. R. D., with the request that the latter organization bring the matter to the attention of those manufacturers. If the latter be found not amenable to reason and justice, that then notice be given to all of

the pharmacists of the United States requesting them to use all of the influence possible to limit the sale of said preparations.

One of the pleasant things to which I called your attention last year was the era of good feeling which then prevailed amongst pharmacists. This condition, which is largely the result of the organization of the national and local trade societies, the closer relationship into which pharmacists have thus been brought, and the removal of much of the distrust and suspicion of former years, has resulted in improved trade conditions. In fact in many parts of our country these conditions are more favorable than have been known before for years. All honor to those who have worked so hard to accomplish these most desirable results, for an improved financial condition of pharmacists is most devoutly to be wished and sought for, as it means so much in so many ways. It means more of leisure for the hard-worked druggist, the means and opportunity to attend the state and national pharmaceutical meetings, an increased attendance upon our colleges of pharmacy, and the adoption of pharmacy as a profession by a better qualified class of young men, and above all the chance to acquire a reasonable competency for the time of old age and the support of those dear to us. I have indicated that much has been done for the betterment of the pharmacist, yet there is a tendency on the part of some to complain because greater progress has not been made. Let us not forget that "Rome was not built in a day;" the evils of years can be righted but slowly; it is better to conciliate an enemy than to fight him. If, however, we do have to fight to maintain fair prices, let us be careful to fight along those lines which are legal as well as just.

The last year witnessed much pharmaceutical legislation attempted or achieved; some good, some bad, and some indifferent. It seems that we must be continually on our guard against the unwise acts of our duly elected representatives, eternal vigilance being the price of pharmaceutical safety.

Some excellent legislation has failed in some of the States from a variety of causes; perhaps the chief cause of failure has been the apathy of the pharmacists themselves. I am convinced that any legislation that is reasonable can be obtained by pharmacists if they go about it in the right way. The *first* thing in the preparation of a bill for legislative enactment is to remember that laws are passed for the welfare of the *public* and not for any one class; any advantage accruing to pharmacy must be only incidental. The *second* thing is to have the desired legislation passed upon by a constitutional lawyer, so that if the legislation is secured it will not later be declared unconstitutional. The *third*, and not the least important thing, is to arouse the interest of the pharmacists themselves in favor of the desired legislation, and have them exert all possible pressure upon the members of the legislature. Personal interviews and letters from their constituents carry great weight with legislators. In this connection it might be said that the model pharmacy law adopted by this section last year, while not adopted in its entirety by any State that I am aware of, has, I am sure, been of value indirectly in indicating what the desired legislation should be like.

A few words may not be out of place with regard to the personnel of the different State pharmaceutical examining boards and the method of appointment thereto. It is to be greatly regretted that the governors of the different States do not follow the example set by the governor of New Jersey, who voluntarily confines his appointments to the pharmaceutical examining board to the list presented to him by the State Pharmaceutical Association. Too often politics or other unworthy considerations influence the appointments, with the result that men of but ordinary qualifications are selected to pass upon the qualifications of young men who know much more than their examiners. This last winter I was in conversation with a pharmacist who thought he was as much entitled to be a member of the "Examining Board" as any one, and that he had possibly sufficient "pull" with the governor to get the position; the governor, however, thought otherwise and turn him down. I asked this would-be examiner "if, in case he had

secured the appointment, how he would have managed the duties of the examination." He replied that "he didn't pretend to know enough to prepare the proper questions, but if he had secured the position he was coming up to the college to get some of the members of the faculty to prepare them for him." Now the question which I cannot solve is this: How could one who had not the ability to prepare a proper set of questions know enough to decide whether the questions had been properly answered? There seems to be no way of controlling these appointments by law, for such a law in many of the States would be declared unconstitutional, as limining the governor's appointing power. It is possible that the different State Pharmaceutical Associations might create a public sentiment strong enough to induce the appointment of only the best men. The "Course in Commercial Training," instituted some two years ago by one of our Colleges of Pharmacy, has been imitated by a number of other colleges: whether this has been caused by a realizing sense of the value of such a course, or simply to be able to say that they are up-to-date and have everything that is going, is a question; yet it is not a question that such a course may be made of the greatest value in enabling the embryo pharmacist to avoid the rocks of financial failure by a wise adherence to proper business methods. It would probably pay the wholesale drug houses and allied interests to endow such a chair in each College of Pharmacy; they would simply be putting a little of their money where it would eventually do them the most good.

One of the evils to which your attention has been repeatedly called is the working of the United States patent laws, which allow the patenting of both the process of manufacture, the product of manufacture and the copyrighting of the name of the article manufactured. This extreme liberality of our government, greater than that of the governments of those countries where many of these articles are manufactured, constitutes a burden amounting annually to millions of dollars, the larger part derived from the sick and the suffering. It seems to me that a deadly blow could be struck at this evil by rescinding the right which now exists to obtain product patents to be sold under registered names. We have smarted under this injury for years past, and have talked the matter over at great length: is it not possible that the time for action has arrived? I would recommend to the Association the appointment of a committee to take this matter in charge, that they be empowered to procure the services of an eminent patent lawyer to aid in preparing a bill to be presented to the Association at its next annual meeting; then if approved by the Association, the bill should be introduced into Congress and a strong effort should be made to secure its passage, by enlisting the support and co-operation of all the pharmaceutical and medical societies of the country.

There has been considerable talk the last year about the hours of labor of drug clerks, and an effort was made in one State to limit the time of labor by law. There is no doubt that it would be advantageous, at least to the clerks, to have shorter hours, but in many cases the proprietors cannot do otherwise; in other cases they will not do otherwise. I have found out by experience that it pays to be as liberal with one's clerks as possible; to remember that they are flesh and blood, and that they get tired, and need a change as well as ourselves. A pharmacist who seeks the welfare of his clerks will generally find himself well paid.

Much has been said about a suitable memorial to the late Prof. Procter, and opinion is by no means a unit as to the form it should take. To my mind the question depends entirely upon the amount of money that is contributed. If the amount permits, a research laboratory should be established in the city of Washington. If this cannot be done, then one or more post-graduate scholarships should be established, the awarding of them to be done by a committee of the American Pharmaceutical Association.

With regard to the work of this Section, I would say that a number of papers which will probably be of much interest are promised us. I hope their reading will be listened to with attention, and that they will be valuable in calling out much intelligent discussion. The Secretary of the Section will present the usual statistics

regarding registration and the number of pharmacists in the United States. These statistics, which no other organization endeavors to secure, are of much value in showing the status and trend of pharmacy.

The address was greeted with applause.

Mr. Mayo moved that, as the address contained a recommendation, it be referred to a committee of three for consideration and report at the next session. The motion was adopted.

MR. RYAN: Mention was made in the address of the Chairman of the incapacity of some of our state examiners. While I do not care to cast any reflection on any of the good men we have on our state boards, I want to substantiate that charge as to others. Only within the last six months I received a letter from a young man who flattered himself at being appointed on a state board, and he wanted me to prepare him twenty questions in chemistry and send to him at once, as he desired to use them the next week. It is hardly necessary to say that I did not comply with his request.

MR. HYNSON: Some points in the address are very interesting to me. It is a singular thing that Maryland, for instance, is still without a pharmacy law. We have not followed the lines that Mr. Lowe suggests, and which I have ofted urged my fellow pharmacists to adopt, viz: to get the public interested in the passage of such a law by showing them that it must be for their protection, though reacting in general good to the pharmacists. I have tried to show them that instead of going to the Legislature themselves they should show the prominent people of the state that such a law was needed, otherwise the legislators always come at us with the statement that we are after a job to further our own interests.

In our college we are glad to imitate another college in the matter Mr. Lowe has referred to, and I take especial pains to tell our students that the system was inaugurated by the Philadelphia College; and I want to say that it was the most interesting and satisfactory work I ever did, and the students took it up with a vim.

THE CHAIR: On the Committee on Chairman's Address I will appoint Mr. Beal, of Ohio; Mr. Kremers, of Wisconsin, and Mr. Ryan, of Michigan.

Mr. Lowe resumes the chair.

The chair called on the Secretary to read his report, which he did as follows:

REPORT ON LEGISLATION AND REGISTRATION.

Presented at the Forty-ninth Annual Meeting, St. Louis, Mo., Sept., 1901, to the Section on Education and Legislation of the American Pharmaceutical Association.

Gentlemen: During the Association year 1900–1901, legislation affecting the pharmacist was attempted in nineteen states, meeting with success in eleven. Of the non-successful attempts the majority provided for the registration of physicians without examination, and the unanimity with which these have been defeated speaks well for the activity of pharmacists in legislative matters during the past year.

It has been customary for your Secretary to present in his report a brief summary of the pharmaceutical legislation of the year, but Dr. Beal will present an exhaustive paper on this subject before this Section, and in order to avoid useless repetition, such information as had been collected by the Secretary was placed at Dr. Beal's disposal.

It may be worthy of note that in the original legislation proposed in the state of Pennsylvania, provision was made for the registration of apprentices without preliminary educational requirements. It was well that this clause was stricken from the act before

its passage, as without some requirement as to the applicant's fitness to become a pharmacist, the registration of apprentices must fail in its primary object, keeping the ranks of pharmacists closed to those who, from lack of a fundamental education or from other causes are unfitted therefor.

STATISTICS OF THE PHARMACISTS OF THE UNITED STATES.

STATE.	Total on Rolls.		Registered last year by Exam.		Registered without Examination.				Ph. G.'s or P. D.'s on Rolls.	Women on Rolls.	End of Board Year.
	R. P.	A. P.	R. P.	A. P.	Ph. G.'s.	M. D.'s.	Other Causes.	A. P.'s.			
Alabama	918	....	37	....	3	6	....	....	....	5	5-15-'01
Arkansas	1098	....	24	....	10	....	....	....	71	2	6-30-'01
California (Est.)	5024	954	9	7	28	....	6	....	1495	12	
Colorado	683	33	54	6	....	....	....	....	130	....	6- 1-'01
Connecticut	450	400	75	....	25	....	....	....	....	15	6- 1-'01
Delaware	179	29	6	....	5	6	....	....	60	6	6- 1-'01
Dist. of Columbia	846	....	24	....	23	....	....	....	....	5	7- 1-'01
Florida	800	....	300	....	20	200	280	....	....	3	
Georgia	1300	....	59	....	....	36	....	....	....	4	11- 1-'00
Idaho.											
Illinois	4604	1166	127	120	....	....	38	9	....	116	12- 8-'00
Indiana	3703	354	38	25	....	....	....	....	....	....	7- 1-'01
Iowa	3319	....	126	10	150	....	....	....	1000	75	4-23-'01
Kansas	1451	62	47	8	....	....	....	....	201	22	5-20-'01
Kentucky	1858	....	38	....	....	....	....	....	....	....	10-10-'00
Louisiana	1098	289	30	14	....	....	4	....	....	15	6- 1-'01
Maine	852	36	23	4	....	....	....	....	....	9	
Maryland	364	....	40	....	4	....	....	....	275	....	5- 1-'01
Massachusetts	3953	....	68	....	....	....	....	....	....	75	9-30-'00
Michigan	3147	381	108	59	....	....	....	....	....	76	6-30-'01
Minnesota	1330	173	90	53	....	....	9	....	....	30	1- 1-'01
Mississippi	1025	....	30	....	....	....	....	....	54	5	4- 2-'01
Missouri	12770	....	88	....	88	2242	....	....	....	9	6-15-'01
Montana (Est.)	284	10	22	....	....	....	....	....	....	1	
Nebraska	1465	....	28	....	....	....	....	....	....	40	1- 1-'01
New Hampshire	658	84	52	8	....	....	....	....	....	2	10- 1-'00
New Jersey	1724	52	74	18	....	....	....	....	....	4	5- 1-'01
New Mexico	88	3	6	...	7	....	....	....	23	1	12- 1-'00
New York—											
Eastern	5823	....	390	....	105	315	....	....	2118	58	12-31-'00
Middle	6214	353	2607	353	....	....	396	....	....	....	9- 1-'01
Western	130	25	24	15							
North Carolina	583	....	64	....	....	....	....	....	....	3	6- 1-'01
North Dakota	292	136	12	....	....	....	11	51	....	2	7-31-'01
Ohio	3352	714	140	84	....	....	2	....	....	....	5- 1-'01
Oklahoma	234	7	41	2	9	....	....	....	65	6	7- 1-'01
Oregon	542	60	22	16	....	....	....	....	....	17	5-21-'01
Pennsylvania	4900	1675	305	352	....	....	....	....	2650	62	
Rhode Island	248	186	1	33	....	....	....	3	....	4	
S. Carolina (Est.)	280	....	10								
South Dakota	485	31	32	14	....	....	....	....	63	5	
Tennessee	1233	93	15	24	....	....	83	....	....	16	4-19-'01
Texas (Est.)	1500	40	....	....	....	....	....	....	....	30	
Utah (Est.)	269	41	6	1							
Vermont	475	2	16	....	2	...	....	....	....	2	8-31-'01
Virginia	770	47	40	15	....	6	8	....	....	2	3- 1-'01
Washington	552	33	63	10	2	....	....	....	....	10	5-31-'01
W. Virginia	1240	....	22	....	6	....	....	....	61	4	4- 1-'01
Wisconsin	1428	385	23	67	....	....	10	1	....	35	8-12-'01
Wyoming.											

NUMBER OF REGISTERED PHARMACISTS IN THE UNITED STATES.

From Board reports	86,051
Estimated additional (Idaho and Wyoming)	250
Total	86,301
An increase over last year of	12,954

NUMBER OF REGISTERED ASSISTANT PHARMACISTS IN THE UNITED STATES.

From board reports	7,854
Estimated additional	200
Total	8,054
An increase over number reported last year of	213

NUMBER OF PHARMACISTS REGISTERED LAST YEAR IN THE UNITED STATES.

From Board reports	9,205
Estimated additional	20
Total	9,225
An increase from number registered last year of	4,147

NUMBER OF ASSISTANT PHARMACISTS REGISTERED LAST YEAR IN THE UNITED STATES.

From Board reports	1,056

The large increase in the number of Registered Pharmacists may be accounted for by the registration of physicians on medical diplomas, in certain States, notably, New York, Florida and Missouri, there having been 2,242 physicians registered in the latter State alone. This was due to the repeal of the provision in the old pharmacy law, permitting physicians to register without examination, 2,242 having taken advantage of the old law prior to the time of its repeal.

The Secretary of the Missouri Board of Pharmacy reported 12,770 Registered Pharmacists on the rolls, which is an increase of 9,270 during the year, evidently an error. Though the increase in the number of Registered Pharmacists in this State must have been large, it could scarcely have been as great as this.

Of the number of pharmacists registered during the year, 2,885 were registered on examination, 487 on pharmaceutical diplomas, 2,811 on medical diplomas and 451 other causes. From these figures, we see that the number of physicians registered as pharmacists is almost as great as the number of pharmacists registered during the year.

No reports were received from the following States: New York, middle section, California, Montana, South Carolina and Utah. The data for these States were obtained by estimating from the reports of registration as published in the various journals.

In collecting the statistics above, reports were requested from the Secretaries of the various Boards of Pharmacy, and your Secretary desires to return thanks to those who by their promptness and ready reply, materially lightened his burdens.

Respectfully submitted, J. A. KOCH, *Secretary.*

September, 1901.

Mr. Mayo moved to refer to the Publication Committee, and it was so ordered.

The chair stated as the next order of business, in the absence of reports from the committees, the nomination of officers for the ensuing year, and called for nominations for Chairman.

Mr. Koch nominated Mr. E. G. Eberle, of Texas, for Chairman.

THE CHAIRMAN: I should have liked very much to have Mr. Koch, of Pittsburg, take this position for the coming year, because he is so thoroughly conversant with the duties of the position that he would make an excellent presiding officer; but as he will be in Europe then, it will be out of the question.

The nominations will be left open and posted, and they can be added to at the next meeting.

Nominations for Secretary were called for, and Mr. Stevens nominated Mr. Payne, of Georgia; but that gentleman declined the honor, saying that he never undertook a thing unless he could perform it to the best of his ability, and that other engagements would prevent his doing justice by the position.

Mr. Beal nominated Mr. J. W. T. Knox, of Detroit, and there were no other nominations at this session.

The chair called on Mr. Beal, of Ohio, to present a summary of legislation which he had prepared for the Section.

Mr. Beal then presented the following:

REPORT ON PHARMACY LEGISLATION.

BY J. H. BEAL.

The past year has been fruitful of efforts in legislation affecting pharmacy, if not fruitful of results. A host of bills of all degrees of merit and demerit have been pressed for enactment, with about the usual measure of success.

The states of California, Illinois and New Jersey placed upon the statute books complete new pharmacy laws. All of these are improvements upon the laws which they displaced, and each one presents one or more of the features embraced in the general form of law approved by this Association at its Richmond meeting in 1900.

An examination of the various measures proposed shows a marked interest in legislation affecting the sale of morphine, cocaine, chloral and alcoholic liquors. In Kansas and Tennessee measures were adopted forbidding under heavy penalty the sale of morphine and cocaine, except on physicians' prescriptions. In Alabama and Colorado similar measures were introduced, but failed of enactment. Bills regulating or taxing the sale of liquors were introduced in Colorado, Massachusetts, Michigan, Rhode Island, Wisconsin and Maine. Those in Colorado, Maine, Massachusetts and Rhode Island were successful. These facts teach that if pharmacists do not take up and deal rigorously with these matters they will be dealt with by the general public, and in a way not likely to be altogether agreeable to the pharmacist.

The anxiety of physicians to register as pharmacists without examination still continues. No less than six bills with this purpose were brought forth during the past year, none of which were fortunately allowed to pass. In one state, Missouri, the right of physicians to register without examina-

tion was repealed. The states of Virginia and Wisconsin passed bills permitting persons in business before the passage of the pharmacy act to register without examination.

The net result for the year is, on the whole, decidedly in favor of pharmaceutical progress, and shows a gratifying increase in the interest and intelligent understanding of pharmacists in legislative matters over those common ten years ago.

The following States report on legislation passed or attempted during the past year: Georgia, Indiana, Iowa, Kentucky, Mississippi, North Dakota, South Dakota, Washington and West Virginia.

Alabama: The Hefflin Poison Bill required the prescription of a physician for the sale of any article enumerated in the schedule of poisons. Failed.

The Doster Bill, prohibiting the sale of morphine, opium and cocaine, except on the direction or prescription of a reputable physician, under penalty of $20 to $50 fine, or imprisonment in the county jail for one to twelve months, manufacturers and wholesalers excepted. Failed.

A bill to exempt pharmacists from jury duty, and another to permit graduates of Mobile Medical College to register without examination. Both failed.

Arkansas: A medical bill, including a clause subjecting druggists to a fine of $100, for recommending any medicine for the cure of any ailment was introduced, but failed of passage.

A bill to permit "legally licensed practitioners of medicine" to conduct drug stores without examination was defeated, as was also one requiring the formula of proprietary medicines to be printed on the package.

California: In this State an entirely new pharmacy law passed, and the old law of 1891 was repealed. The new statute is, on the whole, a decided improvement upon the old one. It is noteworthy for including wood alcohol in the list of poisons the sale of which must be recorded, though other and more dangerous poisons may be sold without recording.

Another bill enacting a new pharmacy law was introduced, but was defeated, as was also one requiring wood alcohol to be labeled poison, and its sale recorded. (The requirements as to wood alcohol are included in the general law; see above.)

Colorado: Colorado passed a revenue bill, one clause of which places an annual tax of $25 upon druggists who sell alcohol or fermented beverages.

A bill was also introduced into the Senate, but was defeated, which would have prohibited the sale of cocaine, morphine, opium, or malt, vinous or spirituous liquors, except upon a physician's prescription. The penalty for violation was a fine of $25 to $1000, and imprisonment in jail for 3 to 6 months. An especially dangerous feature was the clause which gave half the recovered penalty to the informant, a kind of provision always fruitful of blackmailing schemes by self-constituted detectives.

Connecticut: The Secretary of the Board of Pharmacy for Connecticut reports that some pharmacy legislation was attempted during the past year, but was defeated. He does not, however, state the nature of the proposed legislation.

Delaware: It is reported that legislation somewhat on lines of the American Pharmaceutical Association model was attempted, but failed.

Illinois: New law adopted governing the general practice of pharmacy.

Kansas: In Kansas a statute was enacted prohibiting the sale or dispensing by any person of morphine, cocaine, or chloral, except upon the prescription of a physician. The penalty for violation is a fine of $25 to $100, or imprisonment in the connty jail for 30 to 90 days, or both.

Maryland: Attempted amendment of the Baltimore law and its extension to the entire state. Failed.

Maine: Measures were enacted taking away the power of the pharmacy board to revoke certificates of registration, making all offenses against the pharmacy law punishable by fine, and requiring the signature of one person to a sale of liquor, instead of two signatures as heretofore.

Massachusetts: In this state a number of bills affecting pharmacy were introduced into the Legislature, but only two were successful. One amends the sale of liquors act by prohibiting the sale of intoxicating liquor to a person "known to have been supported in whole or in part by charity during the twelvemonth preceding the date of the license." The other modifies the powers of the Board of Pharmacy in regard to the revocation of registration for violation of the pharmacy law, and provides that a person accused of violations of the law shall have access to the records and documents of the Board of Pharmacy. The amendment also provides a penalty of $50 for the violation of sections of the law not otherwise provided for.

Michigan: In Michigan a bill was introduced which gave to the Board of Pharmacy the right to revoke the registration of a pharmacist convicted of selling liquors unlawfully, and providing for an assistant secretary whose business it should be to discover and bring to punishment those guilty of violating the liquor and pharmacy laws. The measure received a large amount of support, but unfortunately failed of passage.

Minnesota: Three bills introduced to register physicians as pharmacists without examination, and one to reduce renewal fees. All failed of passage.

Missouri: Section 3037 of the Revised Statutes was amended so as to prevent the registration of physicians as pharmacists without examination as heretofore. Before the new law went into effect, however, 2,242 physicians registered.

New Hampshire: Attempted legislation reported. Have not been able to obtain copies of measures proposed.

New Jersey: The pharmacists of New Jersey were successful in obtaining the passage of an entirely new pharmacy law which embraces some distinct improvements over the one displaced.

New Mexico: An unsuccessful attempt to pass a new pharmacy law reported. The writer has been unable to procure a copy of the proposed measure.

New York: The state of New York distinguished itself by the number of bills introduced to amend the pharmacy law, or affecting the practice of pharmacy in some sort or other. Out of no less than twelve measures introduced, two passed. One repealed the law which gave official rank to pharmacists in the National Guard, and another gives unregistered persons in villages of less than 500 the right to sell medicines under a permit from the State Board of Pharmacy.

North Carolina: In North Carolina an attempt was made to amend the law so as to permit the registration of physicians as pharmacists without examination. Defeated.

Oklahoma: In Oklahoma an attempt was made to amend the pharmacy law so as to permit country merchants to handle patent medicines and common household remedies without the permit and annual fee of $100 required by the present law. The measure failed of passage in the upper house.

Pennsylvania: In Pennsylvania the section of the pharmacy law requiring triennial renewal of registration was amended by requiring only one registration, for which a fee of $12.00 is charged in the case of pharmacists and $5.00 for qualified assistants.

Another measure which was in effect an entire remodeling and revision of the present pharmacy act was introduced and vigorously pushed, but failed of passage.

Rhode Island: In this state an act was passed requiring every certificate of registration to bear the statement that it is granted upon condition that the person named thereunder shall not violate the provisions of chapters 92 or 102 (the liquor sections) of the general laws, and providing that registration shall be revoked, and the certificate of such become null and void upon conviction for such violation.

Tennessee: In this state was passed a law prohibiting the sale or giving away of cocaine or any compound of the same, except by wholesale druggists or on a physician's prescription, and prohibiting the refilling of any such prescription. The penalty for violation is not less than $100.00 nor more than $500.00 fine, and imprisonment in county jail or work-house for thirty days to six months.

Also a law forbidding the substitution of one drug for another in prescriptions, or the substitution of any other medicine for the specific medicine mentioned in the prescription. The last clause was doubtless intended to cover the substitution of any preparation of a given article when a given brand or make of the preparation was specified. The penalty is $25.00 to $100.00.

Vermont: The Secretary of the State Board of Vermont reports an un-

successful attempt to enact a new pharmacy law modeled somewhat on the lines of the present Ohio law, and the American Pharmaceutical Association Model Law.

Virginia: The Virginia Legislature passed an act enabling all persons who prior to March, 1889, had three years' experience in pharmacy, but who had failed to register within the time limit of the old law, to register without examination by applying for such registration on or before the first day of July, 1901.

Wisconsin: In this state a bill defining every liquid containing one per cent. of alcohol as an intoxicating liquor was introduced, but failed.

The section of the American Pharmaceutical Association Model regulating the vending of medicine or medical appliances by hawking, peddling or public outcry was introduced and met with much favor, but finally failed of passage. A poison bottle bill, of the usual style, was introduced, but killed. The only measure which passed was, unfortunately, one permitting any one who had been in the drug business prior to the enactment of the law of 1882 to register without examination.

Applause followed the reading of the paper.

Mr. Mayo moved to receive the report and refer to the Publication Committee.

MR. PAYNE: I simply wish to make a few supplemental remarks to that paper, touching state legislation in Georgia on the subject of the sale of cocaine. Before our city legislation in Atlanta, we found that the negroes had become very much addicted to the use of cocaine, and there were several stores in the negro quarter there that were supposed to derive three-fourths of their income from the sale of cocaine—that is, some people believed this; I cannot say how true it is. This seems absurdly high to me, but I know they have, and do, sell a great deal of it. I have talked to their clerks about it, and they corroborate what I have heard in a general way. The city found that in our poison law the word "cocaine" is not included, and they went to work and passed an ordinance prohibiting the sale of it in the city, and some of these stores immediately established branches just outside the city limits and ran cocaine joints there. Then they came back at them under the State law and made it apply. They appealed to me as State Chemist and member of the State Board of Pharmacy to see whether it was not adulterated. I have just finished some of my work on this line, and it has gone to the grand jury, and they have been indicted and held under very high bond. That cocaine I examined was twenty-five per cent. cocaine and seventy-five per cent. acetanilid. But the darkey seems to be very well satisfied with that kind of cocaine. I asked one of these darkeys about it—how it made him feel—and he said, "I can't tell you nuthin' about it, boss, but it makes me feel like a H banker." [Laughter.] I do not know what an "H banker" is, but I suppose it is a high-grade banker. I simply wanted to call your attention to our city ordinance and State law in regard to this matter.

MR. HALLBERG: Mr. Beal referred to the new pharmacy act that went into effect in the state of Illinois, without mentioning the principal reason for the new act in that state, and inasmuch as this is of considerable importance, I thought I would briefly present to you the reason for that act.

The Illinois pharmacy law, as well as that in Colorado and several other states, provided that only registered pharmacists and assistants, even apprentices, should sell pro-

prietary medicines, and this was in effect for about five years. Although the law did not fully meet with the wishes of those that were instrumental in securing this particular provision, still it undoubtedly did some good, especially in the rural districts, where the stores generally could not sell patent medicines unless they obtained a permit from the State Board of Pharmacy, under certain limited conditions. Now comes the manufacturer of a certain proprietary medicine and tests the constitutionality of the act in this particular, and carried the case to the Supreme Court, and the Supreme Court rendered a decision that this particular provision of the Pharmacy Act was unconstitutional, upon the ground that, inasmuch as proprietary medicines were allowed to be sold, it was clearly unconstitutional to give a monopoly of the sale of patent medicines into the hands of any particular class of persons—in other words, there was no reason why the sale should be restricted to registered pharmacists, inasmuch as (the Court adds) the pharmacist is not required by law to analyze these medicines and be familiar with their ingredients; of course, intimating that in case the law had required that the pharmacist should be familiar with the contents of these medicines—in case the law required the Board of Pharmacy, for example, or even the State Board of Health, to examine into the proprietary medicines and publish the ingredients or the composition of them—then it would be an entirely different thing; then the section of this act confining the sale of proprietary medicines to pharmacists, would evidently have been held by the Supreme Court as eminently proper and correct. I think that is a very important question. I would like to add, that when the suggestion was first made in Illinois to have this provision incorporated in the act limiting the sale of proprietary medicines to pharmacists, it was suggested also that the Board of Pharmacy should be required—or every proprietor of medicine, rather—that the manufacturer should be required to file with the Board of Pharmacy a statement of the ingredients, etc., but that provision was never enacted into a law. If it had been enacted into a law, then the position would have been entirely different. Instead of the situation as now presented to us, where anybody can sell them, no one but the registered pharmacist would have been permitted to sell these proprietary medicines. It seems to me this particular question is involved, and that this recent decision of the State Supreme Court would be well worth your consideration.

The motion to refer the paper for publication was put and carried.

MR. HYNSON: I want to call attention to the trional, sulfonal, and even acetanilid habits that seem to be forming in at least some sections of the country, and I move you, Mr. Chairman, that a committee of three be appointed by this Section to take up and consider the matter of these drugs, as regards the possibility of a habit being formed in their use—sulfonal, trional and even acetanilid. I know of one case in our neighborhood —that of a physician—where the trional habit is being formed, and I believe such practices ought to be nipped in the bud if it is a fact that they exist. The proposed committee should report next year, of course.

Mr. Stedem seconded the motion.

Mr. Mayo offered the following as a substitute for the motion of Mr. Hynson, so as to make the resolution full and comprehensive:

Resolved, That a committee be appointed to consider the question of the acquirement of drug habits, and the best methods of legislative regulation of the danger.

Mr. Hynson said he would accept the amendment to his motion, and the resolution was adopted accordingly.

THE CHAIRMAN: I appoint Mr. Hynson chairman of that committee, with power to select his associates. [Applause.]

The chair called on Mr. Mason for the reading of a paper on "A New Economic Order in Pharmacy," stating that though the paper was a little long, it was upon a new and interesting subject, and he thought the members present would be interested in hearing it.

Mr. Mason read the paper in abstract, eliciting hearty applause from a large part of his audience upon his conception and presentation of his subject. The full text of the paper was as follows:

A NEW ECONOMIC ORDER IN PHARMACY.

BY HARRY B. MASON.

Astronomers prophesy the existence of stars long before they can see them. Chemists predict the presence of elements far in advance of their discovery. And what is thus possible in the realms of astronomy and chemistry is likewise possible, though in smaller degree and with somewhat less certainty, in the realms of society and industry. For, thanks to Herbert Spencer, society has been shown to be governed by laws quite as definite in their action, and quite as capable of determination, as those which govern the organic and inorganic worlds generally. Comparing the new science of sociology with the older one to which it is nearest related, biology, it may be said that just as bodily development, structure and function furnish subject-matter for a science, so exactly does social growth, and the rise of structures and functions by which it is accompanied and followed. There is a social as well as an animal organism, and as in the one case, so in the other, new and more perfect organs follow and respond to the growth of need and desire which make them necessary. As society develops it becomes more and more complex; greater perfection of nature is reached; higher characteristics are born; and the growth of new needs and desires to which these changes give rise must be met by a corresponding growth in the social institutions by which they may be satisfied and expressed—just as in the evolutionary history of an animal species the need for sight is slowly followed by the organ of sight, and the need for hearing by the organ which makes hearing possible. Knowing, therefore, what new needs and desires are being developed by social growth, we may with considerable accuracy foresee the development of institutions which shall be in harmony with them. And so it is that, after carefully studying the changes now going on in the world of industry at large, and pondering over the gradual evolution taking place in our own calling, I think I foresee the development in pharmacy of an economic system which will sooner or later supplant in large measure that under which we are yet operating.

I. THE HISTORIC EVOLUTION OF INDUSTRY.

In the early history of any race each man himself produces the things

necessary to supply his wants—grows his own corn, raises his own cattle, makes his own garments. As the population increases, and new wants develop, there comes a period when men produce only the things which they can produce best, securing the other things which they need by exchanging their surplus with men who follow the same course. This evolution proceeds gradually until the specialization of employment is quite complete, and then, but perhaps not until long afterwards, the next step is reached: those who are of one occupation, finding themselves growing in numbers and becoming a separate class in the community, with special interests somewhat at variance with those of other classes, form themselves into societies in order that they may the better protect and advance their welfare. The coöperative man begins slowly to emerge. Combined effort grows more and more to replace individual effort. Then the machine and the factory succeed the hand instrument and the small producer; men are brought together by the hundred under one roof; manufacturing is straightway done on a much greater scale; large economies are made, the power of production is greatly increased, and manufactured goods fall in cost to the consumer, even while the wages of the worker rise. But these factories are many, are large and well armed, and they fight with one another until the possibility of mutual extermination makes necessary another step in the evolution. The "trust" is born. Numerous large institutions are merged into one vastly larger; and, as has always been the case in the progressive changes of the past, still greater economies are brought about, and still superior advantages secured.

2. THE FINAL GOAL.

Thus the final goal towards which industry has been moving throughout all the centuries is an era of cooperation and combination of effort. The movement has been slow, but constant and irresistible; and the very fact that it has been in response to natural law indicates, even if there were not abundant proof on every hand, that the end is one which will better conserve the interests of man and be in harmony with his higher and ever higher development. So far as moral considerations are involved, it cannot be gainsaid that in a co-operative system men work together in friendship instead of being arrayed against each other in a fierce competitive struggle, and that thus the day is brought nearer when the brotherhood of man shall finally be realized; while, so far as economic results are concerned, the facts clearly show that the expenses of production are lessened, the demand for goods, therefore, enhanced, and the income of the individual man increased on the one hand, while the cost of the goods which he consumes is decreased on the other. So strongly are most of us wedded to the customs and institutions of the present, however, that very decided changes in government or industry are always met at the outset with opposition; and the fierce outcry which was raised at the appearance of the

machine a century ago in England is now, though in lesser degree, being repeated in this country with the trust. There are admittedly certain grave evils connected with the trust as we know it in its early history, but these evils are certainly not inherent, and I do not doubt for an instant that they will disappear when the trust has been made to yield to proper governmental regulation, as it will when society has finally adjusted itself to the new order.

But I do not desire to discuss what seems to me the almost unnecessary question of the benefits which shall arise from the era of co-operation and combination of efforts towards which industry is moving; my purpose is instead merely to state the fact that all industry is really moving resistlessly in that direction. This fact, viewed in the light of history, is scarcely open to doubt. In the field of production we already have in the trust a long stride towards the final goal, while in the field of distribution the rapid growth and success of the department store proves the inevitable tendency. The goal will be reached in the field of production before it will be possible in that of distribution, for the obvious reasons that there are fewer persons involved, fewer interests to harmonize, usually no obstacle of geographical position to overcome, and in general many less difficulties of all kinds to surmount. The professions will respond to the movement last of all, for in them, added to these difficulties of number and geographical position, is a still greater obstacle—the fact that personal reputation, counting for so much, and often constituting almost one's entire capital, will not readily yield to an order which in some measure means its sacrifice. Individualism is much more important in the professions than elsewhere, and will therefore last much longer than in other departments of activity. It may, indeed, never be wholly supplanted by co-operation, certainly not for a long while; but, nevertheless, I believe that the professions will in time succumb to the new order as well as the trades, though perhaps not with the same degree of completeness.

3. THE NEW ORDER IN THE PROFESSIONS.

Indeed, I am of the opinion that the co-operative movement has already reached the professions. In the profession which is generally given first rank, that of the ministry, sectarian barriers are now being broken down daily; there is a world-wide movement towards unity of action if not of belief; federative associations are the order of the hour; and the co-operative spirit is making rapid headway. In the profession which possibly ranks next to the ministry, that of the law, the tendency is still more pronounced. A recent writer has declared that "it is no uncommon thing in New York City to-day to find law firms employing twenty to twenty-five clerks, and having in their offices, either under salary or sharing the profits, from five to fifteen members of the bar;"* and—more

* William O. Inglis, on page 426 of *Munsey's Magazine* for June, 1901.

significant still—it is in such combinations that "the strongest and best lawyers" are to be found. In medicine, the profession which contests the second place with law, and the one with which we as pharmacists are most closely connected, we find that the complete system of local, State, and national associations which has for many years been utilized mainly for social and educational purposes is now being followed—though not superseded—by the next step in organization. Associations are now being formed in several cities for purely business purposes in order that physicians may not take advantage of one another in the cutting of prices and the like, and may protect themselves against such common enemies as the "dead beat" and the legislative halls. That this step is but preliminary to voluntary combination, the history of the trust shows. Competition became so fierce between individual concerns that agreements were first made to uphold an adopted schedule of prices; then exclusive sections of territory were parceled out to each concern; next the concerns were all placed in the hands of trustees to manage in the mutual interests of everybody concerned; but finally, after these various arrangements had been found, because of the weakness and selfishness of human nature, to be futile and ineffective, the only logical step was taken—that of combining these warring concerns into one organic, huge, unified, homogeneous whole.

But the co-operative movement in medicine has gone even beyond this formation of protective organizations. Combination itself has already been reached in small measure. "Medical Supply and Attendance Companies" have been formed in several cities for the purpose of contracting with subscribers to furnish them with physicians' services at a stated sum each month. And within a year Boston has witnessed the organization by a number of physicians of the "Union Medical Service Company," which was formed for the same purpose, and which, it was reported in the Boston and Massachusetts papers, would "ultimately open branch offices in every city of the United States and Canada." Though some of these companies have apparently been formed by physicians themselves, they have been frowned upon severely by the "ethical" members of the calling, just as the dental companies now to be found in all the large cities receive the censure of "ethical" dentists. But this attitude of medical men towards the medical companies in nowise affects the fact that the first step in the direction of the final goal of combination has been taken in medicine. Indeed, a prominent physician only recently declared it not at all unlikely that "medical men ere long will organize on a co-operative plan, with the various specialties grouped about an able general consultant." *

Thus the co-operative movement has already made considerable headway in the three leading professions, despite the fact that greater obstacles are presented here than in what are known as the trades and businesses.

* Augustus Caillé, M. D., on page 458 of the *Review of Reviews* for April, 1901.

4. THE NEW ORDER IN PHARMACY.

It is natural to expect that our own calling, occupying a position midway between trade and profession, would be reached by the tide sooner than any of those mentioned in the preceding survey; and upon investigation this is found to be the fact. In the so-called "company pharmacy" of England and Scotland we find the principle of combination already firmly established. Beginning more or less precariously twenty years or more ago, the company-pharmacy movement has developed and spread in Great Britain until now company after company owns twenty, forty, eighty and a hundred "shops." And last spring the next step was taken when one large company bought out another, thus gaining coutrol of 248 stores, and having a capitalization of 300,000 pounds, or a million and a half dollars! The factory, the trust, the department store, the medical and dental companies—all these forms of combination have been met on their appearance with fierce hostility; and company-pharmacy in England has shared the same fate. But, like them, it has withstood all opposition. The creature of natural law, it has proved irresistible. Effort after effort has been made by the pharmacists of England to exterminate it by legislative enactment and otherwise, just as in this country, and more particularly in Germany, the extermination of the department store has been resolutely and perseveringly sought; but artificial law can never stop the operation of natural law, and our English cousins, discovering finally the absolute futility of their efforts, and observing the unabated growth of the movement, are now wisely attempting to regulate instead of destroy. Meanwhile the sentiment against the companies is gradually subsiding, and pharmacists, at last learning the lesson imparted so clearly, are beginning in a small way to combine and form companies themselves.

I would not be understood as an unqualified defender of company pharmacy as it exists to-day in England. The movement has in some respects exerted an unfortunate influence, and this I shall refer to in another paragraph. On the other hand, that company pharmacy has been of undoubted economic benefit cannot be gainsaid. Basing my statements upon the reports of five fair-minded, unprejudiced men thoroughly familiar with the conditions in England and Scotland, I may say that the companies have considerably reduced operating expenses; applied what might well be termed scientific methods to the conduct of business; avoided credit losses by adopting an absolutely cash method; and lessened the percentage expense of running a shop by increasing the amount of trade done at a given cost. It is significant that, with here and there an exception, the companies have the largest establishments in London. It is likewise significant that the clerks, except for the sentiment against companies, a sentiment which, as I have said, is now diminishing, had much rather work for the companies than for individual pharmacists. The businesses are larger and the room for advancement therefore more ample;

the division of labor is greater, and the hours of service therefore fewer—a condition made more desirable still by the custom of closing at seven o'clock evenings and all day on Sundays; and the profits being good, and a fair effort being made to divide them more or less equally between employee and stockholder, the salaries are much larger—from twenty to fifty per cent. larger, declares one of my correspondents.

5. THE NEED FOR IT BECOMING MANIFEST.

It is only a question of time when what is thus known in England as "company pharmacy" will, with certain differences, be generally realized in the United States. The conditions favorable to its development are gradually being given birth. The need for it is slowly but unconsciously coming to be felt. During the last two or three decades pharmacy has become less and less remunerative. The inevitable and natural development of the department store has taken away much of the trade in toilet articles, sundries, and even proprietary medicines; the equally inevitable and entirely natural development of manufacturing pharmacy, which is but the tardy application of the factory system to the drug industry, has taken away most of the manufacturing of medicines formerly done by the pharmacist himself; and the physicians' supply-house, which, though hated by the pharmacist, is still but a natural outcome of the tendency toward combination and centralization of effort, has taken away a considerable share of the physician's patronage, while even more of it has been taken away by the physician himself, who, impelled by the gradual lessening of his income, has been more and more given to doing his own dispensing and leaving the pharmacist entirely out of the reckoning. Nor is this all. Not only has the content of retail pharmacy—the quantity of it, so to speak—been greatly reduced, but that which is left has been rendered less remunerative through the lessening of prices and the consequent reduction of profits. Finally, as if this were not enough, the number of pharmacists has continued to increase. Not only has the pasture gotten thinner, but more and more men have been turned into it for sustenance.

Under these conditions there could be but one result. While the more capable and energetic have, by redoubled efforts, continued in the path of success, the majority have been reduced to a condition which is far from satisfactory. Discontent and restlessness have naturally developed. Grumbling has been heard on every hand, and on every lip has been the wail: "Pharmacy is a failure. No longer can any money be made in it. No longer, indeed, can we scarcely keep our heads above water." The era of industrial prosperity which has been casting its mantle over us now for two years, and which has brought warmth and gladness in pharmacy as elsewhere, has lessened the growing dissatisfaction, but when the reaction comes, as it inevitably will during the next two or three years, the old feeling is sure to break out again. And what does this feeling portend?

What means this restlessness, this discontent? Simply this: the old order is gradually being outgrown, and the need for a new one is gradually being developed. The point is slowly being reached like that in the evolutionary history of an animal species when continued growth and development make necessary an organ of hearing or one of sight, and as in the one case, so in the other, the organ will slowly follow and respond to the changes which make it necessary.

6. THE PREPARATION FOR IT BEING MADE.

And while thus the need for a new order in pharmacy is slowly developing on the one hand, on the other preparation for its reception is unconsciously being made. I mean by this that the co-operative spirit is growing among pharmacists; and much of this growth may be attributed to the National Association of Retail Druggists. This body has made the pharmacists of the entire country to realize, as they have never realized before, that they are one in thought and purpose; that they are striving to fight the same battle and endeavoring to accomplish the same ends; and that they should stand together in the protection and advancement of their interests. To a considerable extent, at least, mutual distrust has given way to mutual confidence; hostility and warfare have been succeeded by harmony and united action; and the energies which were formerly wasted in fighting one another have been marshaled against common enemies.

But turning from these beneficent results achieved by the N. A. R. D., other evidences may be noted of the growth of the co-operative spirit. Three notably successful mutual insurance companies among pharmacists are to be found in Ohio, Wisconsin and South Dakota, and the establishment of two or three additional ones is a probability of the near future. Several local associations have within recent years provided defense for their members in damage suits and the like, and others have lately been considering the advisability of undertaking, not only this work, but other co-operative activities as well. And, until they were seen to threaten the failure of that union of interests between retailer, jobber and proprietor upon which the N. A. R. D. plan depends for success, "buying clubs," as well as companies manufacturing "non-secrets," had developed to a considerable extent. All these phenomena are evidences of the growth of the co-operative spirit in pharmacy, and they pave the way for, and make possible, the approaching era of combined activities, centralized control, and a more complex and highly-organized structure.

7. EARLY BEGINNINGS OF THE NEW ORDER IN THIS COUNTRY.

But while the new order in pharmacy will be ushered in very slowly, and will by no means be complete, or perhaps even well started, within the lives of any of us here present, there are already evidences of its ten-

tative appearance among us. Within the last few years corporations owning a number of stores, like Hegeman & Co., of New York, have developed in several large cities; and other bodies controlling stores in different cities, like the Los Angeles Drug Co., have similarly come into existence. But more recently a much longer step has been taken. In Pittsburg, Pa., forty drug stores, I believe, are now under the control of one corporation; and thus has "company pharmacy" already gotten an appreciable start in this country. In Chicago a similar effort to bring a considerable number of the best stores in the city under one centralized control was made last spring, as those of us will remember who were much disturbed by the "drug trust" reports in the newspapers and drug journals. And now, as I am writing this paragraph, the air is full of rumors from that staid old town of Philadelphia concerning the operations of some syndicate, duly incorporated, and having a capital of $1,000,000, which proposes to buy a large number of stores, close up those which are unprofitable, and improve the others in every possible way, in each case retaining the former proprietor as manager. These beginnings are experimental; it is possible that some of the more ambitious ones will not succeed, that the need and the preparation for them have not yet proceeded far enough; but, if I mistake not, they all show the direction in which the current flows, and though they meet with obstacles at the outset they are sure to gather force and impetus as the favorable influences continue to grow.

8. THE FORM WHICH THE NEW ORDER WILL ASSUME.

The precise form which the new order in pharmacy will ultimately assume it would be folly to attempt to foretell. It can only be said with probable accuracy that at first, and doubtless for a considerable period, what in England has been termed "company pharmacy" will obtain here —that is, a number of stores will be under the control of one corporation. Barring a few unprofitable stores that will doubtless be closed from time to time, each store now existing will be continued with the present owner retained in most instances as manager. As it is in England, so probably will it be the case here, that several "companies" or combinations will exist in a single city; and it seems probable that these will continue to grow in size until, fierce competition arising between them, as it did between the individual factories, a large combination formed out of them all in each city will be created exactly as the trust was created, and for exactly the same reason.

It will of course be a considerable period before all individual stores will pass into combination control. Those pharmacists with whom the element of personal reputation is strong, and particularly those who have built that reputation up by virtue of professional and scientific activities, will for a long time remain in possession of their individual businesses. Nay, more, I believe that at first the number of such pharmacists will even increase

in response to the growing demand for scientific services from pharmacy, and in resistance to that commercialism which is quite likely to attend combination in its early history. But when the point in the history of combination has been reached when commercialism begins to disappear through the elimination of competition, when professionalism begins to develop as a natural reaction, and when the increasing demand for scientific service will be satisfactorily supplied, the day will have arrived when even the scientific pharmacist with a large reputation will discover that it is suicidal to continue in competition. He will find it desirable to give his services to a combination which will reward him liberally, and in which, moreover, his reputation will suffer little or no diminution.

It would seem at first thought that the control of all, or nearly all, the stores in a city by one central power, and the continued maintenance of these individual stores under the charge of managers, would be the ultimate form assumed in an era of combination. The apparent necessity of having separate stores scattered throughout the city for the supply of local trade would appear so manifest as to preclude the possibility of these ultimately giving way to one great, central establishment in each city—or perhaps to two or three such establishments. And yet, though I dare not predict such an outcome, I should not be at all surprised if, returning to this sphere three or four centuries hence, I should find it realized. Distance has been "annihilated" with great rapidity during the last few decades; and it is a perfectly safe prediction that it will be "annihilated" to a still greater degree in the decades to come. The electric railway, now only in the early stages of its development, is sure to increase in rapidity and convenience until a mile will be but as a rod. The telephone is equally sure to be improved and cheapened until an instrument will be found in every house, and until two persons miles apart will be as near together as though sitting in the same room. Already, too, we have pneumatic tubes for the transmission of mail from the central to the branch post-offices in a city; and it would be strange indeed if in time a complete pneumatic delivery service, by which the large stores could send goods to their customers, did not succeed the slow and expensive wagon system employed at present. When one can give his order through the 'phone to a store five or ten miles distant, receive the desired goods within five or ten minutes, and do this without stepping out of the room, or perhaps even rising from the chair, what need will there be for separate stores scattered throughout the city to supply local trade? What purpose will be served by a store two blocks away when, through the perfection of mechanical agencies, one five or ten miles distant is, in terms of convenience, much nearer?

9. THE FINANCIAL EFFECTS UPON THE CALLING.

But leaving aside all interesting speculation as to what the ultimate

form of combination will be, let us ask ourselves a more practical question: What will be the effect of the new order upon the well-being of the calling to which we have devoted our lives, and the improvement and advancement of which we desire most devoutly? All forms of combination have been greeted on their appearance with hostility, and we may expect the same greeting to be given at the appearance of combination in pharmacy. But in reality will the change be for weal or will it be for woe? What, in short, is likely to be the effect of an era of combination upon the financial, the educational, and the professional interests of pharmacy?

These are questions fraught with vital importance to us, and I regret that I have but little time and space left in which to discuss them on this occasion. So far as the financial advantages alone are concerned, it is scarcely necessary to argue that combination will result in great improvement. Indeed, it is primarily to avoid the economic wastes of the pre-existing industrial order that the new one is ushered in, and if it be doubted that these wastes will be avoided in pharmacy as elsewhere, it is only necessary to point to the history of company pharmacy in England. Despite the fact that the companies have in every case started new stores instead of buying those already in existence, thus greatly increasing competition; and despite the additional fact that they have greatly reduced the percentage of profit through the reduction of the retail price which this competition made necessary—despite these unfavorable conditions, I say, the companies have paid their managers and assistants salaries considerably larger than those paid by individual pharmacists; they have meanwhile paid their shareholders good dividends; and their stock can usually be bought only at a premium.

In this country, where existing stores will be bought instead of new ones started, where it will not therefore be necessary to reduce prices and so reduce the percentage of profit, and where, moreover, it will be possible after a time to begin the closing of unprofitable stores, is it not reasonable to expect that still greater economic advantage will result? Nor will this advantage redound only to the benefit of the officers and leading stockholders in the corporation. We have seen how salaries all along the line have been increased by the English companies; and, moreover, as in the great field of industrial production the stock will more and more be owned by the wage-earners, and thus the day of real co-operation be gradually brought about, so will the clerks and managers of pharmacies in the new order be part owners in the organization which employs their services. Thus securing larger salaries, and in addition getting their share of the general profits, they will be directly benefited by the superior economic advantages of combination.

10. EDUCATIONAL AND PROFESSIONAL EFFECTS.

That combination will result in educational and professional advantage

to pharmacy, as it will to its economic or financial advantage, is by no means so certain. It must be admitted that the tendency of company pharmacy in England has been rather to lower than to elevate the professional status of the calling. But I think this has been largely, and perhaps wholly, the result of conditions which would not obtain in this country. The English companies, as I stated a moment ago, started new stores instead of buying those already in existence; this of course meant competition with the existing stores; and competition meant cut-rate and other methods which could only result in professional deterioration. In this country the tentative movements towards combination already under way indicate that existing stores will be purchased and the foregoing condition of things therefore avoided.

But, even with this rock avoided, it is possible, and I think quite likely, that in its early stages combination, giving an impetus to the commercial spirit, will sink the professional spirit into partial shadow. Should this really come about, however, I believe it will be but temporary. I have faith that ultimately, when the new order has become fairly well established, and when it has adjusted itself to the conditions, it will redound to the professional and educational interests of pharmacy not less than to its economic interests. By reducing the number of men in the calling it will cause the elimination of the unfit, and place a greater premium upon excellence, and by demanding, in the interests of economy and success, a better and better service from employees, it will make necessary a greater degree of education and training. Moreover, combination, in making possible a higher degree of organization, and a more extended division of labor, will separate pure pharmacy from the innumerable side lines which conceal it from public view, and which make its advancement well-nigh impossible. The specialism which has developed other professions and sciences so markedly within the last decade will be possible in pharmacy, and with the same good results. If there ever comes about the great central establishment which I have not dared to predict, then will pharmacy truly come into its own. The various chemical, microscopical, compounding and dispensing operations will be split into numerous divisions, each will be developed to its utmost; and the day will have arrived which we all wish for so devoutly—the day of the trained pharmaceutical specialist!

II. THE AUTHOR'S PURPOSE.

But I do not desire to be understood as a special pleader for the combination system in pharmacy. I am not endeavoring to make out a good case for it. Neither am I striving to hasten in the least the day of its appearance. My purpose is simply to express my belief that it is coming; that it is as inevitable as the tide; that, whatever its consequences, we shall have to accept it and adapt ourselves to it; and that we had better prepare ourselves for its appearance, and endeavor to increase its advan-

tages and decrease its disadvantages, than to waste our time and dissipate our energies in a futile and Quixotic effort to hurl ourselves against it and destroy it. As to just when it will come, no man can tell. Economic law operates with exceeding slowness. Great natural movements sometimes consume ages in their development. We may not expect that the new order in pharmacy will suddenly appear among us, and quickly attain its perfection. The youngest of us will scarcely see it well established, and it may be ten or twenty or thirty years—perhaps even fifty years—before it gets even a good foothold. It is folly to predict the date when a change is likely to come about, for no one ever knows anything about it, and the wisest make prophecies which are proved ridiculous in the unfolding of time. Let us be content with the belief that the new order in pharmacy is coming, though we cannot tell when; let us realize that all efforts to oppose it will be futile; and let us, remembering Darwin's law, prepare to adapt ourselves to it and be the fit to survive instead of the unfit to perish.

Mr. Knox, seconded by Mr. Eberle, moved that Mr. Mason's paper be referred to the Committee on Publication.

Mr. Beal: I regret that the pressure of other duties I have had has prevented me from examining this paper with the thoroughness that its importance deserves. I think, however, that some difference of opinion may justly be allowed without justifying the assertion that the author's efforts are not properly appreciated.

I am interested in this paper; I am interested in the spirit which prompted it, and I am interested in the care with which the author has attempted to develop his ideas. But progress, Mr. Chairman, does not proceed in straight lines—progress has never proceeded in straight lines—and I fear that, in order to reach the conclusions the author has reached, we must assume that there is to be no turning aside from the general trend and direction which economic matters seem to have at present.

This paper holds out to us as the final goal of pharmacy — socialism pure and simple [exclamations of "No! No!" from several members]; but why limit it to pharmacy? I am not afraid of the word "socialism" when it means the greatest good of the greatest number. I hope that we shall continue to progress along lines which will result in the improvement of the masses of the people. It may be that the great trusts—as the Steel Trust—have their good side; and I am reminded that a certain Roman Emperor once wished that the Roman people had but one neck, so that he might cut off its head at one blow; and if these trusts continue to enlarge, we may have a chance to deal in this manner with the last big trust that has swallowed all the others, and turn its affairs over to the State.

I admit there is a great deal in present tendencies to justify the belief of the author, but I am not prepared to admit that there is no other goal to look forward to than a single great organization, with a single head, a single executive body, and an army of followers who are shareholders or servants. I am not quite prepared to admit that conclusion. There is too much of the personal element in pharmacy and the other professions to admit of the entire capitalization of all the talent in existence. The successful pharmacist of to-day is the man who has the strongest personality, who has brought it most prominently into his business, and impressed it most forcibly on the people with whom he does business.

It may pay us, if we are opposed to the utter commercialization of pharmacy and its consolidation into one great corporation, to do all we can to cultivate the professional

side for other than ethical reasons. There is something more in the idea of exploiting the professional side of pharmacy than mere ethics—mere altruism. The courts of law have sustained statutes prohibiting the formation of corporations for carrying on professional business, and no doubt will do so again. If ours can be called a profession, that rule would apply; but if it is a mere business of barter and sale, it would not apply.

I do not wish to criticise the author more than to say, that I think other elements may be introduced into this proposition after a while, and that we may reach a different result from the one prophesied in this paper. [Applause.]

Mr. Hinrichs: Gentlemen of the Association, this subject is a very deep one. A man in his self-conceit may stand looking at the weather-vane on his housetop and think he knows whither the wind is going. He may look at his barometer, too, and make his predictions accordingly. He may even possess the power from our government to use the information of a thousand observers scattered all over this great country; and he may, in view of an inauguration of a President of the United States, say over his own signature, and have it telegraphed to the millions of the land, "To-morrow, when our President shall be inaugurated, the weather shall surely be fine," and you will remember that such a prophecy as this was flashed over the country last March, and printed in all the morning papers; and he may do all this in the name of science; but, gentlemen, you remember what really happened—that when our noble President, who is now, unhappily, no more, stepped out of the Capitol at Washington to take the oath of office, the weather was horrible! Even then it was considered a bad omen by some, although of course we are far beyond belief in such things as that. Now true science is true, as we all know; but there is such a thing as false science, and that was false. Now, then, I have just mentioned that to make you understand my point: We notice a few phenomena; we see the combinations of capital; we see among other things this profession of pharmacy apparently in danger of being swallowed up, and the weather-vane indicates that individuality—that this thing we call the unit, the individual—is doomed; that money has been combined, and therefore intellectuality will be. It looks as though the responsibility of the individual will be done away with. We are told we will have certain men with nice salaries; but we are not told that the inevitable result will be slavery for the balance of us. Now, I have seen some of these experiments made on a small scale in a neighboring state. There is a colony there containing something like seven villages, all governed on this plan, for they were socialists who started them, but of a very high order, strictly moral people, as true people as I ever met. Everything is in common there. That is a trust, and it is a trust in fact. I had the privilege of getting intimately acquainted with a number of the leading men there, and instead of being a free community, governed by every one, what was it? There were seven towns, and in each little town there was just one man that governed that town. They had also an old lady there, that only those who had their confidence were permitted to see. For some reason, I was permitted to see her. She was ninety years old at the time I visited her. She had "revelations," but where she got them I don't know, for I am only a mortal man. But the fact is, that the revelations of this priestess or seeress, or whatever you might call her, were communicated to the settlements, and the entire settlements were governed that way.

If pharmacy and other branches of human enterprise are to go as the present indications seem to point out, then man as a responsible unit—responsible to his Creator (whom some have eliminated, but who, I think, still exists)—will not amount to much. But we have seen those things before, and wherever in this so-called evolution it goes one way for a while, all on a sudden something happens and upsets the whole machinery. I for one am not afraid that what we now call trusts will go indefinitely onward and swallow us all up. I hope and *trust* that these trusts will become so great as to break down, as all trusts have done in the past, before the spark of good that is in man.

MR. HYNSON: I want to say that I am truly gratified at the spirit of Mr. Mason's paper. I started out with a little business of my own, and I had all the trials that a man usually has under such circumstances. Then I had two stores: that was more than I could stand. I gave them both up and went into a partnership, and since then we have grown and enlarged, and conditions have improved for ourselves and our employees. Our clerks have more time off and are better satisfied than any clerks in town. It is because our business has enlarged that we have been able to do that. We are pleased to get good men, and we encourage them.

Eight years ago I tried to get my associates in Baltimore into a co-operative pharmaceutical establishment, but I was regarded as too much of a crank for them to take hold. I believe the betterment of pharmacy, as I said in my report, can often be best solved by the consolidation of two or more drug stores in a town. You must have business to justify your efforts.

MR. HALLBERG: While I cannot thoroughly agree with the prophecy of Mr. Mason, I am thoroughly in accord with the sentiments expressed, which may be indicated in the brief words of President Druce, of the British Pharmaceutical Conference last month, when he said, "We have met the machine and we are his." If we want to be in the machine, we have got to be one of the cogs. [Laughter.]

I wish Mr. Mason had extended his observations to the continent of Europe. I have not been there for a good many years, but I understand that in most of the countries of Europe this condition prevails at the present time. In Belgium and France the pharmacists are in a syndicate. In Russia I understand the profession of pharmacy is practically a government monopoly. In Germany and Austria of course they are limited. In Sweden, in 1920 pharmacy will be free—owned by the government; and the control of it will pass by succession to the pharmacists who stand highest in the list of eligibles, the establishment to be without cost to him and to be conducted by him. The conditions may change, but the ultimate result will be the same We all know how everything pertaining to the suppression and prevention of disease is more or less altruistic in character, and I feel satisfied that before many years the physician will have to be compensated by the state, because you cannot expect men to earn their bread and butter by trying to reach a status which will prevent them from getting business, and that is practically the state of medicine at the present time. That is the direction in which it is traveling, and we pharmacists naturally have to follow, more or less, the medical service.

As far as this socialistic proposition is concerned, it is true. There is no movement at the present time throughout the world for the benefit of mankind but it has proceeded on broad socialistic lines or principles. [Applause.]

MR. KREMERS: I am very glad this subject has been presented to this Association, and that it has been discussed in the spirit we have seen. There is no problem in connection with pharmacy that has interested me more than that of co-operation, and specialism that goes with it.

The Central Pharmacy of France has been mentioned. That institution works with a capital of 10,000,000 francs. It has put up several manufacturing plants. It is also its own jobber. It has large depots in Paris and the large cities of France. It has its own journal. It protects the pharmacist in the way of accident insurance, and supplies the country pharmacists with clerks. The co-operation is as complete as could be imagined. It has attracted great attention in Europe. German pharmacists are learning from this Central Pharmacy in Paris. Two of the largest wholesale houses in Vienna—probably in Europe—are preparing to co-operate and establish the Central Pharmacy of Austria. In our own country I might mention the formation of companies for co-operation along like lines.

But to take up one of the principal thoughts I want to present: The writer has stated

that it is easier to co-operate along the line of production than that of consumption. That is true as a rule, but the opposite result has been achieved in some instances. A careful observer has told me that Denmark has become superior to Holland in the distribution of its farm products by means of the co-operation of its farmers. There the small farmers have their joint agent at the depot. The products they send him must be of the very best. If any farmer sends in butter or eggs that are poor, they are sent back to him. Shipments are made to the London market, and they know there they are the very best that can be had and they buy them, and the Dutch market has been the loser.

The principal thing to which I should like to call your attention is this: That we have had co-operation along other lines without destroying individuality. I think the profession of teaching has not been mentioned in Mr. Mason's paper. There are five hundred professors and instructors in one of our largest universities, and, working together, they are a great power for educational advancement. Now suppose each of these professors should set up a little school of his own, how this great power for good would be dissipated. Harvard probably has twelve professors in Greek, specialists in their particular way. Suppose that combination should be dissolved and each should set up for himself, their students could no longer have the advantages they now enjoy. Each of these professors, as I say, is a specialist, and the student goes to Harvard, not because he can get the information desired from one man, but because he can get it from twelve specialists. And so it is with chemistry and the natural sciences at Harvard and other institutions of learning. Our universities are coming together and forming still larger trusts—if you wish to call them such—not for the detriment, but for the advancement of education in the States. They tell us that if we become part of a great machine we must suppress our individuality, but it is also said the motive for progress is individual gain. Now seventy-five per cent. of the best teachers in the country are willing to put private gain aside in order to work in an atmosphere like that of Harvard or Yale. They are willing to give up their individuality to a certain extent in order to attain a higher individuality in an atmosphere that they can find nowhere else than in those places.

Prof. Siemens, the great German scientist, inventor and manufacturer, has pointed out that the greatest thing in the modern achievements of electricity is, not that the cost of production is decreased, but that it is destined to destroy the large factory. He hopes that it will one day make possible again home industry, so that people can work in the midst of their families instead of at the factory, and thus a better influence on the home life will be exerted than is possible with the great factory system of to-day.

The possibility of co-operation along the highest intellectual and moral lines would seem to be within our reach.

MR. HINRICHS: This is precisoly one of those dreams I have referred to. You see the great factories of the land to-day an existing fact, but to-morrow, by the instrumentality of that mysterious power that can be distributed far and wide, the factory disappears never to be known again. At least, that is what they tell us.

MR. LOWE: There are instances of practical co-operation in Philadelphia. For ten years past the retail druggists of the city have had a co-operative buying association, called the Philadelphia Wholesale Drug Association, limited. It has done a successful business—last year a hundred thousand dollars—and I can save, on an average, ten or twelve per cent. by buying from that drug company.

MR. MASON: In reply to the criticisms of the gentlemen who have spoken, I wish to say that, in the first place, I am sorry the paper was so long that I could not read all of it. Just as I feared, I have been misconstrued, and I think largely because my idea, as I have developed it in the paper, has not been presented to you in its entirety. I hope those especially interested in the matter—those who have discussed it—will do me the justice to read the paper complete and with care, especially the parts I have not read.

Mr. Beal suggests that the paper looks forward to an era of socialism. Now words are sometimes differently interpreted. If he means by "socialism" the socialism of Debs and his kind, that is not true. I do not believe in that sort of socialism which looks forward to an era of equality between men, for that can never be until men are born equal.

As to the loss of individuality in an era of co-operation and combination, Mr. Kremers has covered that point quite thoroughly, and it is not necessary for me to say anything on that score. I certainly disbelieve in the view that individuality will be lost by the combinations of the future. Mr. Hinrichs seems to think that is woven in my theory, but he is in error there. Individualism is born in man, and what is rooted in humanity will always exist. The order will change. Individual businesses of one or two or three men will, I think, give way in time. They have already disappeared, to a large extent, in the field of production—given way to larger concerns. In the future, instead of trying to succeed in an individual business, men will strive to get a better place in the larger business. We have men among us who have shown that. Some of our members have really a higher individuality in their present relations than they would have doing business on their own account.

Mr. Beal said something about the courts deciding that combination, as applied to the professions, was not legal. I am not in a position to discuss that point, because I do not pretend to a legal training or knowledge; but combination in pharmacy has developed in England, although they have been trying for twenty-five years there to eliminate company pharmacy. If the courts would decide in their favor, why have they not tried it? As to the accuracy of the view that combination will finally succeed, that is largely theoretical, of course. But in England there are 248 stores under one management; in Pittsburg, 60; in Chicago, 38 or 40. Of course, whether this is to be the rule everywhere is a matter of opinion.

A MEMBER: In my humble estimation, this paper is one of the most important that has yet been brought before this Association, inasmuch as it opens up a new line of thought. It seems to me this paper will and must serve as a beacon-light for us in the future. It gives us a thought which has not been touched upon. Men who may have entertained the thought have probably not dared to promulgate it for fear of opposition. The most important thing is to recognize a condition, before we can intelligently shape our conduct. Now I wish to give this paper a practical application. If the trend of affairs is such as is portrayed here, then we must endeavor to shape our legislative efforts, and our business efforts, in accordance with it. We must not oppose a great cosmic law, but must adapt ourselves to it, that we may not make futile efforts at reactionary legislation. That is the thought that must be the central one in this connection, although I believe it is not expressed in so many words by the author. I beg of you not to be scared by any such word as "socialism" or "State socialism"; and do not confuse State socialism and co-operation; they are vastly different.

As to the suggestion that a cosmic movement does not work in a straight line, that certainly should not determine our actions or conclusions. We do not certainly know that the sun will rise to-morrow — it may be extinguished in an hour — but we have the experience of the past before us to believe that it will. And so, relying upon the past, we make all our plans for the future. While evolution is not in straight lines, nor in regular lines, at the same time there is a general trend, and we can recognize that trend. For instance, we all know that our solar system is moving in space in a certain general direction. While the astronomers cannot tell us toward what particular star it is moving, we do know toward what constellation it is moving. So, likewise, we have the experience of the centuries to show us that all progress in our industrial system is toward co-operation and specialism.

The motion to refer the paper to the Publication Committee was put and carried.

MR. OLDBERG: Mr. Chairman, a year or two ago I requested of the Boards of Pharmacy throughout the United States to send me copies of the blanks they use for candidates applying for examination. I found that some of the Boards of Pharmacy had but one kind, some two or more kinds My object was to see what sort of questions were asked of the candidates before they were permitted to take the examination. I was very much struck with the fact that not one of these blanks undertook to elicit from the candidate any information concerning his preparation for the examination. Some of the blanks, to be sure, addressed to graduates in pharmacy, required them to state what school they attended, and how long, and so on. But there were a number intended for non-graduates, and I did not find in any of those blanks any such questions as these: "Did you ever study Chemistry?" "Did you ever study Materia Medica?" "Did you ever study Pharmacy?" "If so, when and where, and how long?" "What books did you use?" "What ground did you cover?" Not one such question. They were asked: "What is your name?" "Where were you born?" "Where do you live?" "What is your age?" "How many years have you been in a drug-store?" And there it ended. They were permitted to take the examination; whereas, I know if they had been asked these other questions, many of them would have been obliged to say, "No; I never did." Yet these men are examined all the time. Now, last year the Association put itself on record as favoring graduation as a preliminary to examination for registered pharmacists, but said nothing about registered assistants. It seems to me we want to add to that good work by something like this resolution:

Resolved, That it is the sense of the Section on Education and Legislation of the American Pharmaceutical Association that the actual preparation for the pursuit of pharmacy by way of study and training is of far greater importance than the examination which is required by law; and that, therefore, candidates who have not studied the subjects covered by the examination have no rightful claim to be examined by the Board of Examination in Pharmacy.

MR. GOOD: It seems to me that is a very important resolution, and ought not to be acted on without consideration. I do not wish to be understood as particularly taking issue with Mr. Oldberg in the matter. Certainly a candidate before the Board of Pharmacy should be able to show some preparation for his examination, but I am not prepared to say that if I were on that board I should not be able in the course of the examination to find out whether the candidate had prepared for it or not, and what was the nature of his preparation. I do not know that it is exactly proper that we should make as much of this matter as Mr. Oldberg seems to think we should.

MR. OLDBERG: I believe all teachers are well aware that to hold examinations is an extremely difficult matter. I was teaching and holding examinations frequently, a few weeks apart, for ten or fifteen years before I really began to know how to do it to my own satisfaction; and I confess that to-day, after twenty-five years of teaching and examining, I would not feel entirely satisfied if I had not had some personal contact with the candidate, and learned something about him and how he had been preparing himself, before examination. The important thing is, that there should have been a previous training. If the candidate says no to the preliminary questions asked him, why should I go to the trouble and labor and expense of examining him?

Some of the laws provide that the candidate shall pay a fee for examination, but that it shall be returned to him if he fails to pass. That is a great temptation to boards that are hard pushed for funds to pass a candidate sometimes who would not, and should not, be passed ordinarily. Many of the boards are hampered by such laws. I say, why not ask the candidate if he has made any preparation, and if so, what? and if

he answers no, then tell him, we cannot examine you; why should we do so?—go and prepare yourself.

MR. LOWE: We would cut this Gordian knot if we would require graduation in pharmacy before examination.

MR OLDBERG: This applies to registered assistants, who sometimes manage to pass when they have had no preparation, except to cram for two or three weeks.

MR. MASON: These assistants are only registered in two or three states, I believe.

MR. OLDBERG: No, sir; there are a good many registered assistants in the states, and they ought to be registered in all the states.

MR. LOWE: We have them in Pennsylvania, and the candidate pays a certain fee for examination, and if he passes, an additional fee.

MR. OLDBERG: That is only half as bad as the other plan.

MR. SHEPPARD: One of the charges brought against our Board of Pharmacy in Massachusetts is, that they don't let them pass for the sake of getting their money, because they charge them $5 for the first time and $3 for each succeeding time. One man came up, I believe, sixteen times.

MR. BEAL: I think the general idea to be brought out by this resolution is the importance of impressing upon the boards of pharmacy the necessity of causing young men who come before them to make some preparation. They generally ask some successful candidate how he got in. He says, "I just went down there, and they asked me some questions, and I got there." They think they can absorb enough information to pass the board from their experience in the drug-store. There is nothing systematic about it; nothing regular, nothing in due order. As to whether it is an inducement to a state board to pass a candidate rather than to give him his money back, I had the secretary of a state board of pharmacy—and it was a very good board, too, with very good men on it, who wanted to do what was right; and a pretty good secretary, also—to tell me, "I say it with shame, but in order to keep our board running at all, and to prevent our pharmacy law from collapsing, we have, many times, to strain a point and pass men who ought to be turned down, because we would have paid the last dollar out of our treasury, so to speak; we would not have had enough to pay our car-fare." He said, "It is a humiliating confession, but I have to make it."

MR. GOOD: I move to strike out the words "far greater" in the resolution—"is of far greater importance"—and insert the word "equal."

MR. SHEPPARD: I object to that. I think the training is of far greater importance than the examination, and I want to see the resolution stand as it is.

The resolution as originally introduced was then adopted.

On motion of Mr. Mason, the Section then adjourned to 8 p. m.

SECOND SESSION—FRIDAY EVENING, SEPT. 20, 1901.

The Chairman called the Section to order at 8:20 p. m.

The chair called on the Secretary to read the minutes of the first session, but Mr. Ryan moved to dispense with the reading of the minutes, and it was so ordered.

The chair stated that the next order of business was the election of officers for the ensuing year, and said that as there was but one ticket nominated the Secretary might be instructed to cast the ballot of the Section for the gentlemen heretofore named for Chairman and Secretary, respectively.

Accordingly Mr. Lyons moved that the Secretary be instructed to cast the affirmative ballot of the Section for Mr. E. G. Eberle, of Texas, for Chairman, and Mr. J. W. T. Knox, of Detroit, for Secretary, and the motion was adopted.

The Secretary announced that he had cast the ballot as directed, and the chair declared these gentlemen duly elected to the places named.

The report of the Committee on Chairman's Address was called for, but Mr. Beal, chairman, asked for further time, which was given.

Mr. Schneider, of the Northwestern University, Chicago, was called on and read the following paper in brief abstract, explaining that his idea was to do something towards unifying methods of teaching in colleges of pharmacy:

ON TEACHING MICROSCOPY, BOTANY, PHYSIOLOGY, PHARMACODYNAMICS AND URINE ANALYSIS IN COLLEGES OF PHARMACY.

BY ALBERT SCHNEIDER.

The renaissance period of pharmaceutical instruction and practice initiated some twenty years ago and established upon a firm lasting basis about ten years ago, makes it imperative that the courses and methods of instruction in our colleges of pharmacy be carefully arranged in harmony with the evolutionary changes. The changes consisted primarily in substituting the laboratory method of instruction for the old-time lecture method. In other words, instead of merely informing students orally how to practice pharmacy they are now given an opportunity to attain actual experience by requiring them to perform pharmaceutical exercises in properly equipped laboratories. It is, however, not intended to imply that the lecture method of imparting instruction has been discarded entirely. Far from it—the lecture method combined with quizzes and recitations is still *more* or *less* in vogue in all colleges of pharmacy. In some branches of study the lecture course is the only available means of imparting the necessary information. Even in these instances it is hoped that the future may introduce the laboratory method as an adjunct if not a complete substitute. This applies, for instance, to human physiology, general pharmacography and pharmacodynamics. Without entering into the discussion of the relative merits of the laboratory methods and lecture method, I shall now outline very briefly certain courses of pharmaceutical instruction, attempting to harmonize them with the present status of the science of pharmacy. I have elsewhere expressed my views on prelim-

inary education,* and will omit further reference to that highly important matter.

The following tabulation shows the logical sequence of the studies under consideration, without, however, indicating in any way their relative importance.

I. Microscopy and Micro-technique.
II. Botany.
    A. General.
        1. Morphology and Physiology.
        2. Histology.
        3. Taxonomy and Organography.
    B. Special.
        1. Vegetable Pharmacognosy.
            a. General.
            b. Macroscopical.
            c. Microscopical.
                α. Crude Drugs.
                β. Powdered Drugs.
        2. Bacteriology.
III. Human Physiology and Anatomy.
IV. General Pharmacodynamics.
V. Urine Analysis.
    A. Chemical.
    B. Microscopical.

The prime object of this paper is to indicate very briefly how much time may be devoted to the pharmaceutical studies named in first-class colleges of pharmacy, having a view to unifying the courses of instruction. Nothing shall be said of other branches, owing to a lack of experience and adequate information. It is hoped that others will outline and discuss the additional courses.

The courses are discussed and arranged in accordance with the following:

1. Entrance requirements.
2. Time devoted to the college work.
3. Manner in which the courses are presented at the college. Laboratory work *vs.* lecture courses.
4. Educational facilities of the college.
5. Proportionment of the various courses or branches of study at the college of pharmacy.
6. Capacity of students based upon entrance requirement, age and time spent at colleges of pharmacy.

The above items must be kept in mind in order that an estimate of opinion may be fairly accurate.

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* Pharmaceutical Education, Bulletin of Pharmacy, Oct. 20, 1900.

In order to make the paper as brief as possible, I have cited the references to a fuller discussion of details regarding some of the branches of study therein referred to.

I. MICROSCOPY AND MICRO-TECHNIQUE.

According to the present status of pharmaceutical education, it is not practicable to give a thorough course in the studies named, yet the student should have some knowledge of the subjects before being permitted to take up the very important subject of vegetable histology, general and special. He should thoroughly familiarize himself with the mechanism of simple and compound microscopes. He should have some instruction in optics and the construction of mirrors, lenses, substage condensers; he should understand chromatic and spherical aberration, and know how correction is made therefor. He should be familiar with the working properties and working capacity of compound microscopes.

Instruction in micro-technique must even be more limited. The student should know how to make free-hand sections, and how to mount them properly. He thould familiarize himself with the more useful and common methods of making permanent microscope mounts, including methods of infiltrating with celloidin (or collodion) and paraffin, staining and mounting, using the various microtomes, etc. He should know the properties and utility of the more important micro-reagents, including a few of the more commonly employed stains.

The course should extend over four weeks, with about five hours laboratory instruction weekly, supplemented by lectures, quizzes and recitations. A failure to properly insist on this course interferes quite seriously with the work of the subsequent courses.

I have never found it desirable or useful to request students to make permanent microscope slides of the materials studied, as that entails a great expenditure of time, energy and money, without any adequate return. Nor is there any apparent advantage in using dissecting microscopes. Making permanent mounts of drugs and drug particles for examination under low powers seems a special waste of time and energy.

II. BOTANY.

For some time there has been considerable discussion regarding the value of botany in pharmacy, which seems rather remarkable when we consider the fact that most of our drugs are of vegetable origin. Much of the controversy has been due to a difference in the definition of the term botany. In its broad pharmaceutical sense, it includes all of those branches of pharmaceutical instruction dealing with plants as shown in the above outline. There certainly can be no doubt at present as regards the importance of botany in pharmacy.

A. General Botany.

1. *Morphology and Physiology.*—A very brief survey of general botany, dwelling upon morphology, physiology and ecology.

In the presentation of this course the laboratory method is not practicable. The subjects should be presented by lectures, recitations and quizzes, supplemented by text-book reading. Some apparatus for class demonstration would be very desirable to illustrate phenomena of growth, root pressure, evaporation of moisture, influence of sunlight and gravity upon the growth of plants, etc. Most pieces of such apparatus can be quite cheaply constructed by the teacher, provided he has some mechanical skill and ingenuity. While it is undeniable that the subject is quite important, yet only a limited amount of time can be devoted to it; a total of about twenty hours of class work, one or two hours per week. To devote more time to this work would be at the expense of more important work in other departments.

2. *Histology.*—From the standpoint of modern pharmacy, this is a very important division of botany. The extensive use of the compound microscope in the examination of vegetable drugs and their adulterants, makes it imperative that the student should be given a thorough course in general vegetable histology in order that he may recognize cells, tissues, and cell-contents at a glance. This must of necessity be essentially a laboratory course, employing the necessary apparatus, the most important of which is a good compound microscope.

The work should extend over a period of one year with about six hours laboratory work weekly. The student to cut free-hand sections of the representative plant types to be studied, mount the sections temporarily, and make careful drawings of the microscopic pictures of the ections studied.

The importance of this course cannot be too strongly emphasized. It is a necessary preparation to the microscopic examination of vegetable drugs, crude as well as powdered.

3. *Organography and Taxonomy.*—Regarding the presentation of this course there is at present considerable difference of opinion. In many colleges of pharmacy this is made the major course in botany, and in most of the lesser colleges this is the only purely botanical course given. To harmonize this course with the other courses it must be quite brief, especially in consideration of the fact that most students upon entering the college of pharmacy are supposed to have had some of this work in their preliminary schooling (high school, and even in the grammar departments). The course should be presented much like the course in general morphology and physiology above outlined. About twenty hours (one or two hours weekly) of lectures, quizzes and recitations, supplemented by class demonstrations, text-book reading, use of suitable botanical charts, type specimens, etc., should constitute the course. The course should

follow course 1. Courses 1 and 3, as here outlined, should be given during the first year, concurrently with the course in microscopy and vegetable histology.

In this course the student should be made familiar with the gross appearance of plant organs, as leaves, flowers, seeds, fruits, roots, branches, tubers, bulbs, etc. He should be familiarized with the leading systems of plant classification; he should be taught how to analyze plants and how to prepare herbaria. It is evident, however, from the time allotted to the work, that the subjects referred to can be presented in the form of a hasty outline only, most of the time being devoted to vegetable organography.

B. Special Botany.

1. *Vegetable Pharmacognosy.*—This is, of course, the important branch of study, and to which the courses in General Botany are simply preparations. This course should, therefore, be given during the second year, and should extend through the entire year. It should be a laboratory course, the student being given good representative specimens of the more important vegetable drugs employed in pharmaceutical practice. These he should study carefully as to form, consistency, color, odor and taste. To be consistent and logical, the student should receive careful instruction in General Pharmacognosy before taking up the special examination of individual drugs. He should know something about the methods of growing, collecting, drying, garbling and marketing drugs. He should be informed about the causes which lead to the deterioration of drugs, the preservation of drugs, drug parasites, etc. It is true such information is given, but in an erratic way only, usually little by little as the course progresses, or in some schools references thereto are made under pharmacodynamics, or perhaps some other related course. The fact is, general pharmacography is very carelessly taught.

In the scheme here proposed the student is expected to study six or seven drugs at each laboratory session, all of them as to gross characteristics as already indicated, and on an average, two at each session are to be studied microscopically * from carefully made tranverse and longitudinal (radial and tangential if necessary) sections properly mounted. The student should study the drug-yielding plant itself, but the opportunities for this are very limited, in fact do not exist in the great majority of colleges of pharmacy.

The histology of drugs should be made a very important branch of study,

* The significance of the compound microscope in the study of vegetable drugs and their adulterants has been more fully explained elsewhere, see:

1. The History of the Microscope and Its Use in Pharmacy. American Druggist March 25, 1900.

2. The Microscope in Pharmacy. Meyer Brothers' Druggist, serial begun Sept., 1900 and still continued.

and is in reality a continuation, or rather the practical application of the course in general vegetable histology. Suitable clearing fluids and other necessary reagents should be employed.

2. *Powdered Drugs.**—The study of powdered vegetable drugs is really the culmination of the work in vegetable histology. The pharmacist and student will find that the training and experience he has acquired in the above courses is absolutely necessary to enable him to recognize and identify the histological elements as they appear in powders. The student should be given a thorough drill in the microscopical examination of from sixty to one hundred of the more important powdered vegetable drugs, employing the necessary or useful test reagents. Two or three months, with six hours laboratory weekly, should be devoted to this work.

3. *Bacteriology.*—The course in bacteriology must be carefully adapted to the needs of the pharmacist.† It should be a course in general bacteriology, dwelling upon the role that bacteria play in the deterioration of drugs, pharmaceutical preparations, etc. The preparation and preservation of antitoxins, vaccine virus. He should know something about the significance of toxins and antitoxins in health and disease. He should know how to use disinfectants and germicides. In the laboratory he should be taught the methods of sterilization, germ filtration, preparation of culture media and the preparations of bacterial cultures, and such other bacteriological operations as may prove useful to the pharmacist. It is not believed to be practicable for the pharmacist to attempt making diagnostic bacteriological examinations of disease-germs for the physician; the pharmacist cannot properly qualify himself for such work during the brief time that must of necessity be devoted to this work.

About eight weeks of laboratory work (two hours daily) should be given to this work. There should be in addition some lectures, recitations and special reading. The time should be devoted to the study of bacteria in general. Inoculation experiments on animals are not in order.

III. HUMAN PHYSIOLOGY AND ANATOMY.

In many colleges of pharmacy this subject is presented in a very careless manner. The limited time makes laboratory work impossible, yet the subject should not be presented in a superficial manner. The course should be more thorough than the average high-school course in physiology, and the prevailing custom in some colleges of pharmacy to excuse

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* See also:

1. Suggestions on the Introduction of Powdered Drugs in the U. S. P., Proceedings A. Ph. A., 1900, pp. 141–145.

2. Powdered Drugs and their Adulterants. American Druggist, serial begun May 25, 1897.

† 1. Pharmaceutical Bacteriology. Bulletin of Pharmacy, Dec., 1897.

2. Pharmaceutical Bacteriology. Proceedings A. Ph. A., 1900, pp. 186–189.

those students from the course who have had high-school physiology should be abandoned.

The subject must be presented in the form of lectures, recitations and text-book reading, supplemented by the use of charts, papier maché models, a well mounted skeleton, loose bones, etc., and perhaps some class demonstrations. One hour each week during the first year is perhaps sufficient.

This course is simply a preparation for the course in pharmacodynamics, therefore special attention should be given to the functional activities of organs in order that the physiological action of drugs may be understood, only minor attention being given to anatomy.

IV. GENERAL PHARMACODYNAMICS.

This course also is usually presented in a desultory manner. In some schools only casual reference is made to the subject in connection with the work in pharmacography. This course should follow the course in physiology and should therefore be given the second year, devoting one hour per week to the work. Here again the subject is best presented by lectures, but principally recitations and text-book work, devoting nearly all of the attention to the physiological action of drugs, to toxicology and posology. Therapeutics should be almost entirely omitted, as that belongs especially within the domain of the physician. This course really forms the direct connecting link between pharmacy and medicine.

V. URINE ANALYSIS.

To begin with, this subject has no bearing whatever upon pharmacy. It is a branch of study distinctively medical. The proper procedure would be to take this course out of the curriculum of pharmaceutical studies. Medical students receive a very thorough course in urine analysis, both chemical and microscopical, and are much more competent than pharmacists to make the required or desired tests and examinations. Pharmacists are of course fully competent to make chemical examinations of urine, and it is no doubt true that they may occasionally make such tests for very busy physicians. The pharmacist is, however, not qualified to make the necessary or desired microscopical examinations of urine for disease germs, tube casts, pus cells, blood corpuscles, epithelial cells, spermatazoa, etc., etc. Such work must be left to some one well versed in histology and pathology.

The pharmaceutical course in urine analysis, provided one is given at all, should, therefore, consist of the application of the usually recognized chemical tests to normal and abnormal urine.

To sum up, the following would be an outline of the courses discussed, as they would be logically presented in those colleges of pharmacy giving a two-years' course of at least six months each, the student devoting his entire time to his studies.

FIRST YEAR.

1. *Microscopy and Micro-technique.*—Lectures, recitations, quizzes, with text-book reading. Four weeks, about five or six hours weekly. Total 24 hours.

2. *General Vegetable Morphology and Physiology.*—Lectures, recitations, quizzes, class demonstrations with text-book reading. Two hours weekly (maximum time) first term (three months). Total 12 or 24 hours.

3. *General Vegetable Histology.*—Laboratory work. Should follow Course 1 and extend through the entire year, with five or six hours' work weekly (sessions of 1½ hours). Total 60 hours.

4. *Organography and Taxonomy.*—Lectures, recitations, quizzes, class demonstrations with text-book reading. Two hours weekly (maximum time) second term (three months). Total 12 or 24 hours.

5. *Human Physiology and Anatomy.*—Lectures and recitations, employing charts and a mounted skeleton and text-books.* One hour each week for the entire year. Total 25 hours.

SECOND YEAR.

6. *Vegetable Pharmacography.*—Laboratory work.† Five months; six hours weekly (sessions of 1½ hours each). Total, 60 hours.

7. *Powdered Drugs.*—Laboratory work. This course to follow course 6, and to be continued for one month (minimum time): six hours weekly (sessions of 1½ hours). Total, 24 hours.

8. *General Pharmacodynamics.*—Lectures and recitations.‡ One hour weekly during the entire year. Course 5 is a necessary preparation for this course. Total, 24 hours.

9. *Bacteriology.*—Laboratory work, lectures and reading. Two months; two hours laboratory work daily. Total, 90 hours.

10. *Urine Analysis.*—Laboratory work. Two weeks; four hours weekly. Total, 8 to 16 hours.

THE CHAIRMAN: I think Mr. Schneider has done a good work in presenting this paper to the Association. I would not feel like adopting it in its entirety at any college with which I was connected, or exactly as he has presented it, but, on the whole, it is a very good presentation of the subject. In a general way it follows the lines we have adopted at the Philadelphia College of Pharmacy.

Mr. Searby, seconded by Mr. Stevens, moved to refer the paper to the Publication Committee.

* Ashby's Notes on Physiology seems almost an ideal text-book for students of pharmacy.

† One of the available text-books (Culbreth, Maisch, Sayre) is to be used, and each student is to receive good specimens of the more important official and non-official drugs, one or two to be studied microscopically (compound microscope) at each session.

‡ It is much to be regretted that there is no suitable text-book. The medical texts are too voluminous for pharmacy students, and are, furthermore, not adapted to their needs. Have used Potter's Quiz Compendium with fair success.

MR. LYONS: This paper is worthy of discussion. I want to speak to a single point, and naturally one upon which I disagree with the writer. I cannot agree with his idea about urinalysis. The points in regard to this subject, except a few, can be so easily learned that a knowledge of them is within the reach of the student in a short course of study. But I want to make the point that the pharmacist wants to find how he can bring himself into direct relation with the physician; and he can do this in this case by possessing a microscope, letting the physician know on occasion that he has one to use, and talking intelligently about it. It is a good thing for the pharmacist, and pays well for the time required.

MR. HINRICHS: Schools will naturally differ, so our Chairman has just remarked, and I believe it is a very good thing they do differ. As to the supposed importance of recognizing the minor microscopic organic elements, I would say, that I might mention a college not a thousand miles away from this city where one of the professors happens to be also thoroughly versed in medicine, and consequently he is particularly capable of doing that very work.

But coming to the main point, about this unifying and harmonizing of the different college courses. It seems to me it is well enough to present to societies such as this the work done in a particular college, or a synopsis of what is done in several. I think that is very much to be preferred to any general, specified plan. Probably of all the countries in the world France has suffered most from extreme unification. For nearly a century it was absolutely unified—as I presume is perfectly familiar to you all—and only in later years has that system been thoroughly broken into by the establishment of different universities in the provinces. This has been brought about since 1870, when something happened, you know, to cause the French people to think. I believe that one of the greatest advantages that we have enjoyed in this country for so many years has been our freedom from the evil that the older countries have suffered under — of trying to make everybody come up to a certain level, and hampering every line of business by limitations of all sorts. I hope the time will not come when those of us who are a little taller than the rest will be cut down, and those who have not reached the highest stature will be stretched up. Uniformity may be very desirable in many things, but I doubt whether it is particularly called for in our schools of higher education.

MR. SEARBY: I am sorry Mr. Schneider has left, because I differ with him in his ideas of the proper way to teach botany. Having myself essayed for some time to teach this study some years ago, I am not wholly out of sympathy with, or destitute of knowledge of, the requirements of a teacher in that department, though at the present time I am engaged in other work.

Mr. Schneider begins with microscopy and microtechnique. That is all very well, because that will come into advantage when the student begins to study botany. He then takes up general botany, and takes first morphology and physiology; after that histology, and after that taxonomy and organography. That may be a rational manner of presenting the subject to a man that knows something about it, but it is not the way, in my judgment, for the student who knows nothing about it, if you want him to acquire a knowledge of it with the greatest facility. My method was not to trouble the student with any microscopic work at first, nor with anything that required searching for difficult parts; nor did I delay the students with regard to the function of parts difficult to observe. I think the successful teacher always endeavors to stand where the student stands, and then bring him up to his own level. He does not stand way up above him and present the subject to him from that point of view. For that reason I took at first the most conspicuous flowers, in which the parts were most easily observed, and had them consider their position and formation, and a little while afterwards their functions; and as the student learned more and more of the subject I led him on to the more difficult

points of observation. I remember on one of these botanical excursions we sat on the sand hills near San Francisco where there was an abundance of flowers, and I told them to get every flower they could find, and they made a great collection. I said to them that we were to look at nothing but the calyx that day; and I asked one for his description, and he gave it to the best of his ability, and then I would ask another. A student of Agassiz, one of the most successful teachers I ever saw, was once given a fish by Agassiz, with the direction that she write down all she knew about that fish. She said she didn't know anything. "Then stay there until you do know something," he exclaimed. She sat and looked at it, and after a while he repeated the question, and she still said she did not know anything; but he would not let her leave until she knew more than she ever thought it was possible for her to know about the fish. He compelled her to observe; and that was my way in teaching botany. I made the first student tell all he could about the flower, and then I made the next one tell what the first one had failed to tell. So far we had done nothing but look at the calyx of one plant. By that method the student's interest was first secured, and that is one great difficulty; then his powers of observation were cultivated, and what he saw and had to dig out for himself he remembered. I was led to adopt this method of teaching botany by the failure of my own early teacher, Prof. Bentley, whose student I was in London, to instruct his boys. He began with vegetable histology, and I remember every Saturday he would review the class, and it was pitiful to see how little the boys knew of what he was endeavoring to teach. I was a little better than the balance of them, although I had had no more instruction than the rest of them, for I had studied botany as an apprentice in a drug-store, and had gone out and gotten wild flowers and identified them. I had learned enough to have an interest in the subject, and enough to know something about the simpler parts of the plant, but I had not learned anything about cell-structure and all that. My mind had been opened a little bit—there was a small crack there that he could get something in—and I had that advantage over the other boys. If you will give your students the easy things first and let them have the difficult things afterwards, they will learn much more in the same length of time than if you teach them theoretically from the start and give them the hard nuts to crack first.

THE CHAIRMAN: I think Mr. Searby's remarks are eminently wise. We had a professor who adopted too advanced a plan, and the boys knew nothing. The one who succeeded him did better. The average professor cannot imagine how hard it is for students to see things as he does. They take too much for granted. Not long ago I heard a brilliant scientific address, but it would not have been of any use at all to students. Do not let us think our students know everything. The better way is to take it for granted that they do not know anything.

The chair put the motion to refer Mr. Schneider's paper to the Committee on Publication, and it carried.

The report of the Committee on Chairman's Address was again called for, and Mr. Beal submitted the report as follows:

To the Section of Education and Legislation:

Your Committee on Chairman's Address respectfully report as follows:

We compliment the Chairman upon his able address, and for his broad-minded statement of the problems which confront the pharmacist of to-day.

We commend to the attention of the Association his statement of the principles which should prevail in the framing of pharmacy legislation, and of the methods which should be employed in procuring its enactment.

We recommend that the Section of Education and Legislation endorse the views ex-

pressed in the address upon the necessity of the exercise of great care in the selection of members of boards of pharmacy.

Regarding the Chairman's recommendation concerning the preparation of a bill for introduction into the Federal Congress looking to the correction of the evils of the present laws upon patents and copyrights as applied to medicines, we recommend that the proposition be referred to the Committee on National Legislation with power to act subject to the approval of the Association.

We also commend to our members the views expressed by the Chairman with reference to the hours of labor demanded of those in their employment.

Respectfully submitted,

J. H. BEAL, *Chairman*,
F. G. RYAN,
EDWARD KREMERS.

Mr. Mayo moved to accept the report, and that the recommendations made therein be adopted. Carried.

THE CHAIRMAN: That one feature will be referred to the Committee on Legislation. We will now have a little talk by Mr. Stevens on the subject of prescriptions.

Mr. Stevens described at some length his method of taking up prescriptions in the original characters and discussing them before a class of students. He spoke of the advantages accruing from the study of original prescriptions and explained how he overcame the difficulty of commenting on the prescription while in the student's hands, by tracing the prescription on a lantern slide, the surface of which has been smeared with some old (partly resinified) oil of turpentine and then projecting the image on the screen in enlarged characters. More recently strips of celluloid have been used in place of plates of glass and are found more desirable for the reason that the celluloid, being thinner, gives a clearer impression. The celluloid films are moistened with spirit of camphor, to give them a dull surface, and laid over the prescription, which is then traced with India ink.

Mr. Stevens' remarks were received with applause.

THE CHAIRMAN: I think this is an eminently wise way of teaching this subject. It is a way Mr. Remington has used for some years. He has a very large collection of prescriptions of all kinds, and in lecturing to his students he always uses a lantern. This plan of using celluloid is new to me, and is very interesting, indeed.

MR. WALL: I have used the lantern slide a good deal for other purposes, and I have found white writing on a black screen is more pleasant to the eye—it is not so tiring. If a white screen is used with a brilliant light there will probably be some in a class, if it is continued long, that will have a headache from it. I have not used this plan with prescriptions, but I have with statistics and other things.

MR. STEVENS: How will you have my handwriting in your prescription if you use that process?

MR. WALL: If you write it black on a white surface and I photograph it and use my negative, I will have your handwriting white on a black field.

MR. STEVENS: Where you are copying prescriptions from any and everywhere, I claim you can make them quicker by tracings.

MR. WALL: I think not. I think the advantage is with the photographic process, in time as well as accuracy.

Mr. Eberle was called to the chair while Mr. Lowe read the following paper upon the liquor laws of the States and provinces as they affect pharmacists:

THE LIQUOR LAWS OF THE STATES AND PROVINCES AS THEY APPLY TO PHARMACISTS.

BY CLEMENT B. LOWE.

Having had for some time under consideration the subject of the Sale of Alcoholic Liquors by Pharmacists, with the view of learning more about the subject, by permission of the committee I addressed a circular to one or more members of the A. Ph. A. in each of the states and provinces. The circular read as follows:

"There seems to be quite a lack of uniformity in the laws of the different States in regard to the sale of alcoholic liquors by pharmacists. In some States the laws bear harshly upon pharmacists, and they are not allowed to dispense them, even upon physicians' prescriptions. In others the latter privilege is allowed, but sales cannot be made otherwise, even in cases where life and death are involved. In still other States the privilege of sale is restricted to a certain number. It is possible that in a few States too much liberty is allowed (or is taken) and the pharmacy too often degenerates into a 'speak-easy.'

"It is thought by the committee that the information asked for will be not only of interest, but also of importance, as from it a model license law, or section of such a law might be drafted. If you will kindly answer the following questions AT ONCE and send them to the committee WITHOUT DELAY, it will be GREATLY APPRECIATED."

After much effort, as is usually the case in any public quest, replies were received from 36 of the States and 4 of the Provinces. The questions asked are hereby submitted, viz:

What are the laws which govern in your State the sale of alcoholic liquors?

1. Is a special license required for their sale?
   - *a*. Under what conditions is this license granted?
   - *b*. What are the conditions governing the sale under such a license?
2. If a license is not necessary, can a sale be made without restrictions?
3. If a license is not required, but their sale is restricted by law, do any of the following restrictions apply?
   - *a*. Must a sale be on a physician's prescription only?
   - *b*. Can such a prescription be renewed?
   - *c*. If the proprietor of the pharmacy is a physician, can he write a prescription for such a sale?
   - *d*. Is the writing of this prescription permitted in the store, or in an office attached to the store?
4. Can alcohol be sold in your State for use in the arts and sciences?
   - *a*. Is this privilege abused by its sale as a beverage?
   - *b*. Are alcoholic tinctures sold to any extent as a beverage?
   - *c*. Are you in favor of the reduction of the internal revenue tax upon alcohol?
   - *d*. Are you in favor of the government allowing the sale of methylated spirits? (Wood alcohol 1, Alcohol 8.)

5. Are the license laws of your State as they apply to pharmacists, generally observed?
   a. Can you suggest any desirable changes in them?
6. Any other information upon this subject will be received with pleasure.

It was first intended to classify these answers, but as it was found exceedingly difficult to do so, it was thought better to give a brief synopsis of the answers arranged according to states, hence I submit the following:

Arkansas.—A license is required, $500 for state, $600 for city, which is granted under the same conditions as for a saloon. In the absence of a license, prescriptions can not be dispensed legally, nor renewed, neither can the proprietor, if a physician, write a prescription for such sale.

Alcohol can be sold under the United States license; not much used as a beverage, as there are plenty of saloons; the same applies to alcoholic tinctures. Strongly in favor of a reduction in the internal revenue tax upon alcohol, and of the government allowing the sale of methylated spirits.

Thinks the license laws are generally observed in wet counties, doubtful in dry; also that pharmacists should be allowed to dispense liquors upon physicians' prescriptions, but no renewals.

Arizona.—In addition to the United States license (R. L. D.), a county license must be paid of $30.50 per quarter, which permits the sale of ½ pint to 4¾ gallons. Prescriptions can be compounded without a license; right of renewal questionable; proprietor, if a physician, can write them unless fraud is shown. No exceptions are made in favor of sale of alcohol. Tinctures not sold to any extent as a beverage. In favor of a reduction in tax upon alcohol if its use can be restricted to the arts and sciences. Also in favor of the sale of methylated spirits. License laws generally observed.

Colorado.—A license of $25 per annum required, under which malt and spirituous liquors may be sold for medical purposes. Alcohol can not be sold without a license; it is used to some extent as a beverage. Not in favor of a reduction of the tax upon alcohol, but in favor of the government allowing sale of methylated spirits. The license laws generally observed, but in favor of abolishing them.

Connecticut.—Licenses of two classes. In license towns $50.00 per annum, which permits the sale of one gallon or less of liquor, five gallons alcohol and five gallons of other than distilled liquors, not to be drank on the premises. In no-license towns $10.00 to $12.00 tax is charged per annum for privilege of filling physicians' prescriptions, which can not be renewed, or written by the proprietor, or in an office attached to the store. Alcohol can be sold in amounts of not more than five gallons, which is not used to any extent as a beverage, nor are alcoholic tinctures. In favor of a reduction of the tax upon alcohol, but not of the sale of methylated spirits. Laws generally observed. Would suggest that drinking be absolutely stopped in drug stores, which perhaps can not be done.

Delaware.—License granted by superior court. Sales only to be made on prescription, which can be renewed, and can be written by any physician in his store or office. Alcohol can be sold, the privilege is not abused; tinctures not sold as a beverage. Not in favor of the reduction of the tax. License laws generally observed.

District of Columbia.—No license required. Sale can only be made on prescription, which can not be renewed. No restrictions regarding the writing of the prescription. Alcohol can be sold upon government license; privilege not abused to any extent. Not in favor of a reduction in the tax if the concession has to be made good by a tax on something else. In favor of allowing the sale of methylated spirits. License laws generally observed.

Florida.—Licences granted in all "wet" counties, upon which sales can be made to

persons over eighteen years who are not habitual drunkards. Sales cannot be made in the "dry" counties even upon prescription. Alcohol can be sold in the "wet counties." Privilege probably abused, as also in the case of alcoholic tinctures. Not in favor of a reduction in the tax upon alcohol. Physicians should be allowed to prescribe liquors and druggists to fill prescriptions for the same in case of sickness.

Georgia.—The general State laws regarding the sale of alcohol and alcoholic liquors are very moderate, but they are largely inoperative, as most of the 137 counties are "local option" and have special laws governing the sale.

Idaho.—Annual license of $200 required, upon which sales can be made of one pint or over, not to be drank in the store. Prescription not required. Alcoholic tinctures not sold as a beverage. In favor of reduction of tax upon alcohol. License laws not generally observed.

Illinois.—The general license laws of the State apply to drug stores the same as to saloons, but in cities the city council may authorize the sale of liquors for medical, sacramental, mechanical or chemical purposes—not to be consumed on the premises. Annual license in Chicago, $2.00. Prescription not required. Alcohol can be sold. Used to some extent as a beverage. Not in favor of a reduction of the tax on alcohol. In favor of the government allowing the sale of methylated spirits. The license laws generally observed.

Indiana.—No license required other than the government R. L. D. Sale must be upon prescription when amount is less than a quart; can be renewed. Thinks the proprietor has no right to prescribe, but may dispense. Alcohol can be sold only as mentioned. Hopes it is not used as a beverage. Alcoholic tinctures not used to any extent as a beverage. In favor of a reduction of the tax upon alcohol for use in the arts and sciences. Not in favor of the sale of methylated spirits. The observance of the laws depends on local conditions. It is suggested that permits should be issued by the State Board of Pharmacy.

Kentucky.—Three classes of licenses are issued: "a druggist's," costing $50.00 per year, permitting the free sale of alcohol, but restricts sales of spirituous and malt liquors to prescriptions; "a merchant's" license, costing $100.00, permitting sale in any way, but not to be drunk on the premises; "a saloon license," costing $150.00, permits sale without restrictions. Proprietor of a drug store, if a physician, could write prescription if he has a practitioner's license. Alcohol can only be sold under a license; not sold as a beverage to any extent. Alcoholic tinctures are sold as a beverage in the mountainous districts of the State, where most counties are prohibition. In favor of the reduction of the tax upon alcohol, and also of the sale of methylated spirits. Thinks druggist should be allowed to sell upon prescription without license, and the sale of alcohol for use in the arts and sciences should be free.

Massachusetts.—License granted by Pharmacy Board upon payment of $2.00 for advertising and $1.00 for license. Sales to be made only for medicinal, mechanical or chemical purposes, purchaser signing a special register kept for the purpose. Prescriptions not required. Alcohol cannot be sold without a license; it is used to some extent as a beverage, as is tincture of ginger. Most assuredly in favor of a reduction of the tax upon alcohol, and also of the sale of methylated spirits. Think the law is all right, but it is not properly enforced. In "local option" towns *unprincipled* druggists do a profitable business in the sale of liquors.

Maine.—No licenses are granted as it is an absolute prohibition state, and liquors can not be dispensed even upon physicians' prescriptions. Alcohol can be sold for use in the arts and sciences only by city or town agency. The privilege is abused, as they sell it without discretion. Alcoholic tinctures are not sold to any extent as a beverage. In favor of a reduction in tax on alcohol, but not of the sale of methylated spirits.

Maryland.—License not required. Sales can only be made on prescription, which

can not be renewed. Alcohol can be sold for use in the arts and sciences. Do not think the privilege is abused; alcoholic tinctures not sold to any extent as a beverage, with the possible exception of Tinct. of Ginger. Not in favor of the reduction of tax on alcohol, but in favor of the sale of methylated spirits. In Baltimore a special register is required to be kept, in which must be entered the kind, quantity and price of the liquor sold, purchaser's name and purpose for which sold.

Michigan.—No license required. Liquors can be sold by druggists for medicinal, scientific or sacramental purposes, registration of the sale being required. Sales can not be made to minors except upon written order of parent or guardian.

Alcohol can be sold subject to the U. S. License. It is used as a beverage in localities where the population is largely foreign. Alcoholic tinctures not sold. Not in favor of the reduction of the tax upon alcohol, but in favor of the government allowing the sale of methylated spirits. The license law is generally ignored. A desirable change would be to pass the last proposed pharmacy law.

Minnesota.—Only the government license required. Sale must be made on physicians' prescription, which can be renewed or written anywhere. Alcohol can be sold. Do not think it or alcoholic tinctures are used as a beverage. In favor of a reduction of tax upon alcohol and of the sale of methylated spirits. License laws of the state are generally observed.

Mississippi.—Pharmacists can not sell alcoholic liquors even on a prescription, without a retail liquor license; in the "dry counties" can not be sold at all. Alcohol can not be sold for use in the arts. Alcoholic tinctures not sold as a beverage. In favor of the reduction of the tax upon alcohol, and also of the sale of methylated spirits under certain restrictions. Thinks it would be desirable to have a law allowing the sale upon physicians' prescription strictly for medicinal purposes.

Missouri.—Sale must be on a physician's prescription, which can be renewed, or written by the proprietor of the store if a physician, in the store or office. Alcohol can be sold for use in the arts, etc., the privilege abused only in a few sections. Alcoholic tinctures not sold as a beverage. In favor of allowing the sale of methylated spirits. The license laws not generally observed.

North Carolina.—A license of $50 is required in addition to the United States license. This license permits of sales only on physicians' prescriptions, which can be renewed. No restriction as to the writing of the prescription. Alcohol can be sold for use in the arts, etc. Privilege not abused; nor are alcoholic tinctures sold as a beverage. In favor of the reduction in the tax upon alcohol. Thinks the present license fee should be abolished, as it amounts to prohibition in most cases, as few sell enough to pay the tax.

North Dakota.—License required, which allows the sale for medical purposes only; affidavit of purchaser required as to its intended use. Alcohol can be sold subject to the same conditions. Privilege not abused to any great extent. Alcoholic tinctures not sold as a beverage. The license laws of the state, which are peculiar, are generally observed.

Nebraska.—License not required by the state, but required in the city of Omaha, where application must be signed by thirty resident freeholders of the ward and a bond of $5,000 given. Liquors can only be sold for medical, mechanical and sacramental purposes, and sale must be registered. Sale of alcohol must be registered. Privilege abused to some extent. In favor of a reduction of the tax upon alcohol and the sale of methylated spirits. License law observed "in a way." It is suggested that circulating petitions annually for signatures is a nuisance, without any benefit.

New Hampshire.—No special license required. Sale must be on physician's prescription or permit from town agent. Such prescription can be renewed and there are no restrictions regarding the writing of it. Alcohol can be sold for use in the arts, etc. No knowledge of the abuse of the privilege. Thinks that in the northern parts of the state alcoholic tinctures are sold to quite an extent as a beverage. In favor of a reduction of

the tax upon alcohol and of the sale of methylated spirits. License laws generally observed by pharmacists.

New York.—A special license is required under the "Raine's Law," which is granted upon payment of $5 to licensed pharmacists who give bonds; this entitles to sell only on physicians' prescriptions. The sickness, name and date must be given, and the prescription written for an emergency. The prescription cannot be renewed, neither can the proprietor write it, and it must be written in an office wholly unconnected with the store. Alcohol can be sold for use in the arts, etc. Alcohol apparently not sold as a beverage, alcoholic tinctures rarely. The license laws generally observed. A $450 license entitles to sell in all quantities, but not to be drank in the store.

Nevada.—No license required but the regular U. S. R. L. D. license. Sales can be made without restrictions. Alcohol can be sold for any use. Not sold as a beverage to any extent by pharmacists, nor are alcoholic tinctures. In favor of the reduction of the tax upon alcohol and the sale of methylated spirits. Saloons are so plentiful in Nevada that pharmacists have little use for liquors except for medicine *strictly*. Thinks "a pharmacist's license should be revoked for running a dram shop in every state of the union."

Ohio.—License not required when the sale is on prescription, or is for mechanical, sacramental or pharmaceutical purposes. Law is silent regarding the writing of the prescription. Alcohol can be sold for the uses specified above. Believes the sale of alcohol is abused, as also the sale of essence of ginger. In favor of the reduction of the tax upon alcohol and of the sale of methylated spirits. As the "Dow" tax upon saloons is very heavy, thinks the law is evaded by saloons with drug-store fronts.

Oklahoma.—Pharmacists have no special privileges, but must take out a saloon license if they sell liquor in any way. Alcohol can only be sold subject to the conditions as specified.

Oregon.—License not required by state; prescription not required, but liquors can not be *exposed for sale* or *advertised* or drunk on the premises, but the legitimate demand can be supplied. Alcohol can be sold for use in the arts, etc., its sale or that of alcoholic tinctures not abused. If sales are not made as specified, $400 license required. In favor of reduction of tax on alcohol and the sale of methylated spirits.

Pennsylvania.—License not required, other than the U. S. R. L. D. license. Sales must be only on prescription, which cannot be renewed, conditions as to the writing of them not specified. Alcohol can be sold for use in the arts, etc. The privilege is abused to some extent on Sundays, and on other days where there is a large foreign population. Essence of ginger sold largely by *some* pharmacists on Sundays. In favor of the reduction of the tax upon alcohol and of the sale of methylated spirits. The license laws are fairly observed.

Rhode Island.—License is required, which is granted by the License Board to any registered pharmacist. Prescription not required. Sale must be registered. Liquors cannot be drunk on the premises. Alcohol can be sold on registration; the privilege is abused. Most of the liquor troubles come from the so-called "French." Not in favor of a reduction of the tax upon alcohol, but in favor of the sale of methylated spirits. License laws not generally observed. Have worked for twelve years to have them changed.

South Dakota.—License not required, but pharmacists not allowed to sell malt liquors. Sale need not be on prescription. Sale to be for medicinal or mechanical uses. Alcohol can be sold for use in the arts, etc., the privilege not abused to any extent, nor is the sale of alcoholic tinctures. In favor of a reduction of the tax upon alcohol and of the sale of methylated spirits. License laws not as generally observed as they might be.

Tennessee.—State license required of $300 per year, which is granted under the same conditions as for a saloon. Prescriptions for uncompounded liquors cannot be filled

without a license. Cannot be written by proprietor of store. Alcohol can be sold for use in the arts, etc.; the abuse of the privilege is only very limited, as is the sale of alcoholic tinctures. In favor of the reduction of the tax upon alcohol, and of the sale of methylated spirits upon certain conditions. License laws generally observed.

Texas.—Alcoholic liquors or alcohol cannot be sold under any conditions without the payment of the state "occupation tax" of $300 per year. Alcoholic tinctures not sold to any extent as beverages. Doubtful if the license laws are observed. "Not in favor of a druggist selling liquor under any circumstance."

Virginia.—"The law makes no distinction between druggists and 'regular liquor dealers.' There is an unwritten law that druggists have a right to sell on a doctor's prescription, which most of them do without being prosecuted."

Vermont.—Sales which are "discretionary" and must be registered can only be made through "town agencies." Cannot be sold by druggists even on prescription, neither can alcohol. Alcohol used as a beverage in some places, as is essence of ginger. In favor of a reduction of the tax on alcohol and also of the sale of methylated spirits. License laws not entirely observed.

Washington.—License not required. Sales must be on prescription or for mechanical or sacramental purposes. The prescription can be renewed, and there is no restriction regarding it. Alcohol can be sold for use in the arts, etc. The privilege not abused. In favor of a reduction in the tax upon alcohol, and the sale of methylated spirits. "The license laws practically a dead letter, yet drug stores in Washington are *drug stores* and not *saloons.*"

Wisconsin.—A license may be granted to pharmacists by town or city councils upon petition and the payment of $10, which permits the sale for medicinal, mechanical or sacramental purposes. Sale need not be on prescription. Any person making a false statement to a pharmacist to induce sale is guilty of a misdemeanor, punishable by fine or imprisonment. Alcohol can be sold for use in the arts, etc. The privilege not abused, nor are alcoholic tinctures used as a beverage. In favor of a reduction in the tax upon alcohol and the sale of methylated spirits.

Province of Manitoba, D. of C.—License not required. Sale need not be on prescription. A druggist cannot sell more than six ounces of intoxicating liquor at one time, *for medicinal purposes only.* The purchaser's name must be registered, and the register is inspected semi-monthly by an inspector. Heavy penalties debar both druggist and customer from transgressing the law. Alcohol can be sold for use in the arts, etc., the privilege not abused. Not in favor of a reduction in the tax upon alcohol. 65 per cent. alcohol costs the druggists at *lowest price* $4.75 per gallon; were it cheaper the people might buy it. The people of Manitoba are law abiding, and are free from many of the conditions known in some of the States across the line.

Province of Nova Scotia, D. of C.—License not required. Druggist may sell where there is *no appointed agent.* Such sales must be for medicinal purposes, upon the certificate of a duly registered medical practitioner. For mechanical or manufacturing purposes, upon the certificate of a justice of the peace. Sales to be duly registered, and the register open for inspection by the inspectors, etc. Physicians are held to very strict account for the prescriptions they write. Alcohol can be sold for use in the arts, etc. In favor of a reduction in the tax, which is $3.17 per imperial gallon. The government allows the sale of methylated spirits. The license laws generally observed. In favor of keeping the sale of liquors out of drug stores; they should be sold by *regular agents* or *high license.*

Province of Ontario.—License not required. Sales must be on a *bona fide* prescription, etc., in amount of not more than six ounces at one time, which must be duly recorded in a book open for inspection. Prescription cannot be renewed; can be written by a proprietor if a physician, and there is no other. No liquors can be con-

sumed on the premises, or mixed with soda water, apollinaris, ginger ale, etc. Alcohol can be sold for use in the arts, etc.; the privilege not abused, nor are alcoholic tinctures sold. The government allows the sale of methylated spirits. License laws generally observed. Thinks that a prescription should not be the indispensable condition of sale; thinks the majority of pharmacists could be entrusted with the observance of the laws.

Province of Quebec, D. of C.—Conditions of sale about the same as in the preceding province; amount sold not to exceed one imperial pint. Alcohol can be sold for use in the arts; privilege not abused to any extent. Isolated cases of the sale of alcoholic tinctures as a beverage occur now and then. In favor of a reduction of the tax upon alcohol, as the inland revenue tax amounts to $1.90 per imperial gallon. Methylated spirits largely used in Canada for burning, in varnishes, etc. Now mixed in government stores; shipped as ordered. Price of purified wood alcohol about the same as that of methylated spirits; do not see any advantage in using it.

"I am not a temperance crank, but I do not believe in pharmacists handling liquors at all; the drug store is no place to get liquors."

Although it has been found exceedingly difficult to properly classify the answers received, I have on second thought endeavored to do so as accurately as possible. I submit the following:

I. States or provinces in which *licenses* are required, *nineteen.*
   a. Sales can only be made on physicians' prescriptions, *seven.*
   b. Physicians prescriptions *not* necessary, *ten.*

II. States or provinces in which *licenses* are *not* required, *nineteen.*
   a. Sales can be made without a prescription, *six.*
   b. Sales must be on physicians' prescriptions, *twelve.*
      1. The prescription can be renewed, *seven.*
      2. The prescription can not be renewed, *five.*
      3. Prescription can be written by proprietor of the store if a physician, *eleven.*
      4. Prescription can be written in the store or office attached, *eight.*
      5. Prescriptions can *not* be written in the store, etc., *three.*

III. Alcohol can be sold for use in the arts and sciences, *twenty-nine.*
   a. This privilege is not abused, *sixteen.*
   b. This privilege abused, *eight.*
   c. Alcoholic tinctures used as a beverage, *thirteen.*
   d. Alcoholic tinctures not used as a beverage, *seventeen.*

IV. In favor of a reduction of the tax upon alcohol, *twenty-four.*
   Not in favor of a reduction, *nine.*

V. In favor of the government allowing the sale of methylated spirits, *twenty-four.*
   Not in favor of allowing the sale, *two.*

VI. States in which license laws are generally observed, *fifteen.*
   States in which license laws are not observed, *six.*
   States in which the observance is doubtful, *six.*

VII. States in which alcoholic liquors can *not* be sold by apothecaries: Maine, Vermont, Georgia, largely "local option," Arkansas, Florida, Connecticut, Mississippi, Massachusetts, Kentucky, partly "local option."

It would seem to me that these answers, which have been received from many of the most prominent members of the A. Ph. A., give one at least a bird's eye view of the subject, and that possibly there could be deduced from them two general laws covering the sale of alcoholic liquors in most of the States or Provinces.

I submit the following:

Law A.—Alcoholic liquors are to be sold by properly registered pharmacists only upon the following conditions: A license costing $5 must first be obtained by a registered pharmacist in each drug store where liquors are sold. Sales on the Sabbath day shall be only on the prescription of a duly registered physician, not to be renewed, and subject to the conditions specified below. Sales upon week days shall be to adults not known to be of intemperate habits, of not more than eight ounces in amount, for medicinal purposes only, not to be drunk upon the premises. Not more than one sale to be made to the same person in each twenty-four hours, unless upon the prescription of a registered physician. A special register shall be kept, specifying the date of sale, kind and amount sold, medicinal purpose for which required, name and residence of purchaser. Said register to be always open for inspection by the proper authorities. Alcohol shall be sold only for use in the arts and sciences, and the amount, purpose for which required, and name and residence of the purchaser shall be registered in the above-mentioned register. Upon conviction of any pharmacist of the violation of the law, his license shall be revoked and a sign notifying the public of this fact shall be fastened in a conspicuous place upon the outside of the store. He may also be punished by fine or imprisonment. A purchaser inducing a sale by false statements shall be punished by fine, or imprisonment, or both.

A copy of this law, properly framed, shall be conspicuously displayed in each store receiving a license.

Law B.—Might differ from the above in requiring all sales to be upon the prescription of a registered physician, the prescription not to be renewed, and not more than one prescription to be written for the same party in any twenty-four hours.

Mr. Ryan moved to receive the paper and refer for publication.

MR. BEAL: The preparation of a paper of this kind involves an enormous amount of work. Only one who has had experience in that way can have any conception of the amount of drudgery involved in it, and I think this labor should be acknowledged in a suitable way. Therefore, I move to amend the motion to refer by including a vote of thanks to the author for this paper that he has prepared at so much pains.

Mr. Hallberg seconded the motion and it prevailed.

Quite a lengthy discussion followed, regarding the best methods for regulating the liquor traffic by pharmacists, which was participated in by Messrs. Mason, Lowe, Mayo, Hallberg, Sheppard, Bartells, Hynson, Remington, Eberle, Pettit and Beal, but without reaching any definite conclusions. Several resolutions and amendments thereto, expressive of the sense of the Association on this all-important question were presented, but subsequently withdrawn. The consensus of opinion seemed to be that the less pharmacists have to do with the sale of liquors the better it will be for them.

Mr. Lowe, having resumed the chair, stated that the Secretary had a resolution to offer.

Mr. Koch, Secretary, said that, at the suggestion of Mr. Oldberg, he desired to make a motion that the Secretary of the Section be requested to send copies of the resolution offered by Mr. Oldberg and adopted at the afternoon session, in regard to the importance of preliminary training

for applicants for examination before Boards of Pharmacy, to the Secretaries of the various State Boards of Pharmacy.

The motion was seconded by Mr. Beal and carried.

The chair announced that the installation of officers was now in order, and appointed Mr. Searby a committee to conduct Mr. E. G. Eberle, of Texas, the Chairman-elect of the Section, to the platform.

Mr. Searby performed this duty and introduced Mr. Eberle, who thanked the members for the honor conferred on him and expressed the hope that he would perform his duties satisfactorily. (Applause).

Mr. Eberle took the chair.

Mr. Lowe presented Mr. Knox, the new Secretary, who expressed his thanks for the favor shown him.

Mr. Lowe nominated Harry B. Mason, of Detroit; W. C. Anderson, of Brooklyn, and Henry Kraemer, of Philadelphia, as the new members of the Committee on Education and Legislation it was necessary to elect at this session.

Mr. Kraemer withdrew his name in favor of Mr. Caswell A. Mayo, of New York, and the nominations were closed.

Mr. Lowe moved that the Secretary be instructed to cast the affirmative ballot of the Section, electing these gentlemen on the Committee for the ensuing year.

The motion was put and carried, and the gentlemen were declared elected.

On motion of Mr. Lowe, the Section then adjourned.

ENTERTAINMENTS AT THE FORTY-NINTH ANNUAL MEETING.

After an absence of thirty years the American Pharmaceutical Association again met in the Mound City on the banks of the Mississippi during the week of September 16 to 21, 1901. The wisdom of having secured so late a date for the meeting at St. Louis was shown by the fact that cool weather prevailed during the entire time of the meeting, whereas for a period of six weeks or more previous the city had been in the grip of a torrid wave. St. Louis justly boasts of having one of the finest union railway stations in the world, which was much admired by the visitors.

The Southern Hotel, which had been selected by the Committee of Arrangements as headquarters, left nothing to desire in its appointments and service, everything possible being done by the general manager, Mr. Lewis, looking toward the comfort of the visitors and the convenience of the Association. Spacious parlors for the general sessions and comfortable committee rooms added much to the satisfactory transaction of business.

On the evening of Monday, September 16, the time-honored reception was tendered the visitors by the St. Louis pharmacists in the general parlors of the hotel, on which occasion the officers and ex-presidents of the Association with their ladies did the receiving. On account of the death of the President of the United States the anticipated dance was omitted from the program.

Tuesday morning the visiting ladies were escorted to the St. Louis Museum of Fine Arts, the Missouri Historical Museum, and other places of interest, by Mrs. H. M. Whelpley and her aids. In the afternoon a progressive euchre party for ladies only was held at the hotel and much enjoyed by those who participated. At night a large number of the delegates visited the St. Louis College of Pharmacy under the guidance of several members of the faculty, after which the whole party repaired to the Exposition being held at the Music Hall, where also an opportunity was had of viewing the mammoth Coloseum. A special musical program had been arranged in honor of the visitors by Seymour's Military Band in the Auditorium, which, together with some vocal solos, was greatly enjoyed by all.

Wednesday forenoon was devoted by the ladies to visiting the various public buildings, including the Post Office and Custom House, and in the afternoon, all the visitors, together with numerous local friends, started on an excursion down the Mississippi River, aboard the huge steamer City of

Providence. After reviewing the seventeen miles of river front, the party landed at the historic Jefferson Barracks, and, headed by Weil's Military Band and with muffled drum, visited this military post. They also visited the national cemetery, where the members joined in an appropriate song, as a tribute to the memory of our recently-martyred president. The impressive occasion was one long to be remembered by all who were present.

Returning to the boat, which continued down the river, the entire party was seated and served with a dinner in the immense dining-room of the boat. Refreshments to suit the varied tastes were served during the evening, and a social time ensued. The boat returned at 10 o'clock. From the wharf, more than two hundred of the delegates went direct to the building of the St. Louis "Republic," and were shown how a great St. Louis daily is edited and printed. The only unpleasant feature of the trip was the chilly atmosphere, which made overcoats and wraps quite a necessity.

On Thursday morning, at an early hour, the ladies started on an extended carriage drive, stopping at the Glen Echo Club, nine miles distant from the heart of the city, where they were served with luncheon. The ladies were seated at the dining table when the moment arrived for all St. Louis to observe the proclamation of the mayor in reverence to the martyred President of the United States. Mrs. H. M. Whelpley called the ladies' attention to the significance of the hour, and quoted the following lines from Shakespeare:

> "After life's fitful fever he sleeps well.
> Treason has done his worst; nor steel, nor poison,
> Malice domestic, foreign levy, nothing
> Can touch him further."

This was followed by singing of "Nearer, my God, to Thee." After luncheon, the ladies continued the carriage drive, reaching their hotels late in the afternoon.

Friday forenoon occurred the ladies' Twentieth Century Auction, which was one of the most amusing and entertaining features of their program. In the afternoon occurred the ladies' trolley ride, and in the evening 130 ladies attended the Olympic Theatre.

Saturday found practically all the delegates still in the city. Promptly at 2 p. m. the visitors were escorted to the Anheuser-Busch Brewing Association plant, which they inspected, and then took special trolley cars for the Missouri Botanical (Shaw's) Garden. Here they spent some time under the personal direction of the officers and special guides of the garden. The trolley cars returned them to their hotels. After dinner the visitors were escorted to the Union Club, where they enjoyed the evening entertainment tendered by the Business Men's League of St. Louis. A most delightful programme had been provided, including the rendition of several pieces by the Knickerbocker Quartette, composed of Messrs. Dauer, Ravold, Poepping and Stender, a soprano solo by Mrs. Winslow-

Fitch, and a violin solo by Miss Lulu Kunkel. Following this, a very interesting illustrated lecture was delivered by Mr. Fred. L. Seely, of St. Louis, being an account of his recent trip through the Cinchona Forests of Java. A harp solo by Miss Lowe, a basso solo by Mr. McKinnie, and a violin solo with harp accompaniment by Misses Kunkel and Lowe, concluded the entertainment, after which refreshments were served.

On Sunday, under the guidance of Dr. Enno Sander, a large number of the visitors took a trip, by special train, to the famous Iron Mountain district. Considerable time was spent at the extensive quarries of the Schneider Granite Company, which have supplied material for many prominent buildings in the United States. From here a visit was paid afoot to the neighboring Garden of the Gods, where huge granite boulders of fantastic forms were inspected. Returning to Iron Mountain, the special train conveyed the party to Arcadia, where dinner was served. The party found much of interest in Arcadia, and the adjoining village of Ironton. Grant's monument and the tree under which he received his commission as general of the regular army attracted special attention. Returning to the train, the party enjoyed the homeward trip and the refreshments which were served on the way. They reached the St. Louis Union Station before 8 o'clock, many of them taking trains for their homes.

Among those most active in looking after the entertainment and comfort of the visitors were Messrs. Good, Hemm, Gietner, Spilker, Schurk, Sander, Whelpley, Sultan, Wall, Boehm, Hassebrock, Layton, Seitz and Hinrichs, while Mrs. H. M. Whelpley and a corps of able assistants were untiring in their attention to the ladies. C. C. Jr.

REPORT

ON THE

PROGRESS OF PHARMACY.

From July 1, 1900, to June 30, 1901.

By C. Lewis Diehl.

It is a matter of regret that this report must be presented without the customary lengthy introduction; but the Association has during the past year delegated so much additional work to the reporter—work, which will doubtless be in evidence in the "Proceedings"—that he has failed to find time to write an introductory that might prove interesting enough to publish. In other directions, also, the report may not as fully present the progress made in pharmacy as the reporter could wish; but he believes that it very fairly represents the original work accomplished by American and English-speaking pharmacists, and much that has appeared in the contemporary pharmaceutical literature of the European continent. The hope, entertained from year to year, that the

Proceedings of the State Pharmaceutical Associations

(During the year 1900).

might reach the reporter with fair completeness, has again met with disappointment. In fact, as in the past, the Proceedings of only about one-half of the State Associations have come to his hands, but these have been very completely abstracted. As customary, a brief synopsis of the work done and the papers read before the State Associations is here given; but when the information was gained through the current pharmaceutical press, this is indicated by a prefix to the name of the state—thus "(?)"—the same prefix being used when no information concerning the meeting was at all available.

Alabama.—The Nineteenth Annual Meeting of the Alabama Pharmaceutical Association was held at Mobile, May 15–16, 1900. G. B. McVay, of Birmingham, was elected President; L. S. Brigham, of Montgomery,

Secretary. A committee was appointed to consider the feasibility of adopting a formulary for use throughout this State.

Arkansas.—The Eighteenth Annual Meeting of the Arkansas Association of Pharmacists was held at Little Rock, June 12, 13 and 14, 1900, in four sessions. E. F. Klein, of Hot Springs, was elected President; James A. Ginocchio, of Little Rock, Secretary. Important reports were received and discussed from the Board of Pharmacy and from the Committee of Revision of the United States Pharmacopœia. Dr. J. H. Beidelman, of Little Rock, read an interesting address entitled, "Ancient History," in which he placed on record the important events that have transpired in the history of the Association.

The following papers were read:

"Pharmacy and Queries," by James H. Chestnutt.

"Brown Mixture," by S. D. Knox.

"The Tax on Patent and Proprietary Preparations," by W. W. Kerr.

"Ammonia," by J. F. Dowdy.

"A Brief Review of Some of the Potent Constituents of Drugs," by John Laird.

California.—No information obtained.

Colorado.—The Eleventh Annual Meeting of the Colorado Pharmacal Association was held at Manitou, June 12 and 13, 1900, in four sessions. Charles D. Barnes, of Denver, was elected President; Charles E. Ward, of Denver, Permanent Secretary. The Committee on Queries reported a series of queries, some of which were discussed. A written reply appears to have been received to one only, namely:

"Which is more unethical, prescribing in the drug-store or dispensing in the doctor's office?" by C. P. Janvier.

Connecticut.—The Twenty-fourth Annual Meeting of the Connecticut Pharmaceutical Association was held at Hartford, June 12–13, 1900. Charles S. Finch, of Stamford, was elected President; Charles E. Rapelye, of Hartford, Secretary.

The following papers were read:

"Soda-Water Syrups and their Serving," by John K. Williams.

"Notes on Every-day Pharmacy," by John K. Williams.

Delaware.—The Fourteenth Annual Meeting of the Delaware Pharmaceutical Accociation was held at Wilmington, June 7, 1900. W. A. Jester, of Delaware City, was elected President; F. W. Fenn, of Wilmington, Secretary.

Interesting addresses were delivered as follows:

"On the Advantages of College Training for Druggists," by Prof. F. X. Moerk.

"On the Poetry of Botany," by Dr. A. W. Miller.

Florida.—The Florida Pharmaceutical Association failed to hold a meeting in 1900.

Georgia.—The Twenty-fifth Annual Meeting of the Georgia Pharmaceutical Association was held at Savannah, May 22, 23, 1900. M. H. Taylor, of Macon, was elected President; C. T. King, of Macon, Secretary.

Idaho.—No information obtained.

Illinois.—The Twenty-first Annual Meeting of the Illinois Pharmaceutical Association was held at Chicago during July, 1900. Walter H. Gale, of Chicago, was elected President; Henry Swannell, of Champaign, Secretary.

Important reports received and discussed were the following: On Apprenticeship and Education and on the Board of Pharmacy.

The following papers were read:

"The Retail Druggist in the Country," by H. Swannell.

"Give the People What they Want," anonymous.

"Emulsions," by Mr. Hitt.

Indiana.—The Nineteenth Annual Meeting of the Indiana Pharmaceutical Association was held at South Bend, June 13–15, 1900, in six sessions. F. W. Meissner, of La Porte, was elected President; A. Timberlake, of Indianapolis, Secretary. Important reports were received and discussed from the Committee on Education, the Committee on the Revision of the United States Pharmacopœia, and the Committee on Status of Pharmacy in the Marine Hospital Service.

The following papers were read:

"A Plea for a Better System of Drug Store Apprenticeship," by Leo Eliel.

"Practical Points About Bacteria," by Frank R. Eldred.

"How to Make Certain Medicines Palatable," by Prof. J. W. Sturmer.

"Practical Points on Advertising," by Charles C. Deam.

"The Ipecac Root and Various Methods of Assay Compared," by Prof. I. V. S. Stanislaus.

"Some Data on How the Pharmacist can Save Money by being his own Manufacturer," by Edmund A. Geyer.

"Business Methods," by Dr. W. O. Gross.

"Some Personal Observations on the Domestic Manufacture of Chemicals," by R. I. Eads.

"Peppermint," by Leo Eliel.

"Organization," by T. V. Wooten.

"Volumetric Assay," by H. H. Alexander.

"A Research on Viburnum Opulus," by N. R. Gibson.

"Surface Tension," by Prof. J. H. Cloud.

"How Long will Phosphorus Pills Keep?" by J. N. Hurty.

"Relations that Should Exist Between the Doctor and the Druggist," by Dr. T. F. Massey.

Indian Territory.—No information obtained.

Iowa.—The Twenty-first Annual Meeting of the Iowa Pharmaceutical Association was held at Clear Lake, July 10, 11, 12, 1900, in three sessions. E. H. Baldwin, of Hampton, was elected President; Fletcher Howard, of Des Moines, Secretary. The following papers were read:

"Herbs," by Mrs. E. M. Burns.

"Women in Pharmacy," by Mrs. W. G. Bale.

"Pharmacy Up to Date," by Carrie S. Collins.

"How Shall We Increase Our Prescription Business?" by A. H. Miles.

"Value of Attendance on State Association Meetings," four papers, by Mrs. Fletcher Howard, W. G. Bale, D. J. Gressler and Annie L. Wood.

"How to Protect Our Sundry Trade Against Outside Competition," by N. T. Hendrik.

"Should Formaldehyde be Used as a Preservative in Medicinal Preparations," by John C. Nitzsche.

Kansas.—The Twenty-first Annnal Meeting of the Kansas Pharmaceutical Association was held at Hutchinson, May 22–24, 1900. H. W. Mehl, of Leavenworth, was elected President; E. L. Lair, of Topeka, Secretary.

Kentucky.—The Twenty-third Annual Meeting of the Kentucky Pharmaceutical Association was held at Glen Springs, June 19–22, 1900, in three sessions. C. Lewis Diehl, of Louisville, was elected President; J. W. Gayle, of Frankfort, Secretary. The following papers were read:

"The Proper Relation Which Should Exist Between Competing Druggists," by J. W. Gayle.

"The Advantages and Disadvantages of Our Pharmacy Law," by Addison Dimmitt.

"Is a Druggist Justifiable in Diverting a Sale of Proprietary Medicine?" by C. S. Porter.

"Why are Loaded Sponges the More Expensive and Most Unsatisfactory?" by Vernon Driskell.

"Reasons Why the Druggists of the State Should Become Active Members of the Association," by C. S. Porter.

"Is Soda Water a Profitable Adjunct to the Drug Business?" by Vernon Driskell.

"Is it Profitable, or is there any Special Advantage to the Retail Druggist to Manufacture His Stock of Pills, Tablets, Fluid Extracts, Elixirs and Medicinal Syrups?" by E. B. Walthall.

Louisiana.—The Eighteenth Annual Meeting of the Louisiana Pharmaceutical Association was held at New Orleans, April 23–24, 1900. M. Bernstein, of Shreveport, was elected President; W. P. Duplantis, of New Orleans, Recording Secretary.

Maine.—The thirty-third annual meeting of the Maine Pharmaceutical Association was held at Portland, July 11–13, 1900, in two sessions. H. Boynton, of Biddeford, was elected President; M. L. Porter, M. D., Danforth, Secretary. An interesting report on the drug market and trade interests was presented.

The following papers were read:

"Pharmacognosy—Its Relation to Pharmacy;" two papers, by H. L. Simpson and Ernest T. Jordan.

"What Side Lines Can a Druggist Carry Profitably, and How Shall they be Displayed and Advertised?" by S. R. Crabtree.

"Status of the Drug Trade in Maine Under the State Prohibitory Law," by Chas. K. Partridge.

Maryland.—The Eighteenth Annual Meeting of the Maryland Pharmaceutical Association was held at Hagerstown, June 19–23, 1900, in five sessions. William E. Turner, of Cumberland, was elected President; Louis Schulze, of Baltimore, Secretary. Interesting reports were received from the Legislative Committee, the Committee on Pharmacy, and the Committee on Trade Interests.

The following papers were read:

"Is the Sale of Patent or Proprietary Medicine Increasing or Decreasing?" etc., by John C. Muth.

"What have been the Main Causes which have thus far Prevented the Enactment of a Pharmacy Law by the State of Maryland, and How Can these Causes be Counteracted?" by Alfred R. L. Dohme.

"Are Headache Remedies Containing Acetanilid Dangerous, and Should they be Offered for Sale Promiscuously to the General Public?" by J. Emory Bond.

"Glucose and Glycerin as a Preservative for Syrup of Ferrous Iodide," by H. Lionel Meredith.

"What is the Best Preservative for Fruit Juices, and One that is not Deleterious in Any Way to Health?" by John M. Wiesel.

"Salicylic Acid! Are the Amounts that are Necessary to Preserve any Preparation, in any Way Deleterious to Health?" by J. F. Hancock.

"Colchicum Root and Seed! Why Should Both be Official, and Which is Preferable, and for What Reason?" by Louis Schulze.

"With the Local Physicians Supplying their Patients Directly with Medicines, Should the Pharmacist be Expected to Refer his Customer to the Doctor, when Asked to Furnish a Remedy for some Simple Ailment?" by Robert S. McKinney.

"Does the Distribution by the Pharmacist of Almanacs, etc., with the Pharmacists' Business Card Printed Thereon, Carry with it a Personal Indorsement of the Advertised Nostrum, etc.?" by Columbus V. Emich.

Massachusetts.—The Nineteenth Annual Meeting of the Massachusetts State Pharmaceutical Association was held at Newburyport, June 19–21, 1900, in four sessions. Fred A. Hubbard, of Newton, was elected President; James F. Guerin, of Worcester, Secretary.

The following papers were read:

"How is Pharmacy Recognized in the United States Army and State Militia?" by Ulysses E. Fortier.

"Laboratory Notes; Drugs and Chemicals Varying from Standard Strength of Purity Observed During the Year," by Frederick T. Drake.

"Pharmaceutical Notes," by Prof. W. L. Scoville.

"Reminiscences," five papers, by C. B. Emerson, H. M. Whitney, Max Cramer, J. H. Manning and S. A. D. Sheppard.

Michigan.—The Eighteenth Annual Meeting of the Michigan State Pharmaceutical Association was held at Grand Rapids, August 14–16, 1900, in three sessions. Charles F. Mann, of Detroit, was elected President; James W. Seeley, of Detroit, Secretary.

The following papers were read:

"Pharmacopœial Standardization," by Dr. A. B. Lyons.

"Antidotes in Cases of Morphine Poisoning," by Albert B. Prescott.

"Fluid Extract of Squill," by A. B. Stevens.

Minnesota.—The Sixteenth Annual Meeting of the Minnesota State Pharmaceutical Association was held at Owatonna, June 19–21, 1900, in four sessions. B. O. Kyseth, of Lanesboro, was elected President; E. B. Wilson, of Minneapolis, Secretary. Interesting reports were received on adulteration and on trade interests.

The following papers were read:

"On the Metric System," two papers, by S. Gjesdahl and Frederick J. Wulling.

"Shorter Hours for Druggists and Sunday Closing," by Stewart Gamble.

"How to Conduct a Prescription Stand," two papers, by B. O. Kyseth and W. G. Alwin.

"The College of Pharmacy in the Nineteenth Century," by Frederick J. Wulling.

"How Can We Bring About Greater Uniformity in the Pharmacy Laws of the Several States and in the Methods of the Various Boards of Pharmacy?" by H. G. Webster.

"The College of Pharmacy of the University of Minnesota—Historical (continued from 1899)," by Frederick J. Wulling.

Mississippi.—No information obtained.

Missouri.—The Twenty-second Annual Meeting of the Missouri Pharmaceutical Association was held at Pertle Springs, Warrensburg, June 12–15, 1900, in seven sessions. Paul L. Hess, of Kansas City, was elected President; Dr. H. M. Whelpley, of St. Louis, Secretary.

The following papers were read:

"Hydrargyrum cum Creta," by Carl G. Hinrichs.

"Manufacture of Artificial Diamonds," by J. F. Llewellyn.

"Comments on Revision of the Pharmacopœia," by William Mittlebach.

"Photography, Its Early History and Its Place in Pharmacy," by Ambrose Mueller.

"Practical Pharmaceutical Notes and Observations," by Francis Hemm.

"A Few Notes on the Microscope in the Drug Store," by H. M. Whelpley.

"Mescal Buttons," by J. F. Llewellyn.

"The Assay Processes of the United States Pharmacopœia," by Francis Hemm.

Montana.—The annual meeting of the Montana Pharmaceutical Association during the month of August (?). E. E. Gallogly, of ———, was elected President.

Nebraska.—The Nineteenth Annual Meeting of the Nebraska Pharmaceutical Association was held at Beatrice, June 5–7, 1900, in six sessions. A. W. Buchheit, of Kearney, was elected President; W. M. Tonner, of Randolph, Secretary.

The following paper was read:

"On Liquores," by Mr. Hoagland.

Nevada.—No information obtained.

New Hampshire.—No information obtained.

New Jersey.—The Thirtieth Annual Meeting of the New Jersey Pharmaceutical Association was held at Asbury Park, June 23 and 24, 1900, in three sessions. Stephen D. Woolley, of Ocean City, was elected President; Frank C. Stutzlen, of Elizabeth, Secretary. The sessions seem to have been devoted mainly to the reading and discussion of reports.

New Mexico.—No information obtained.

New York.—The Twenty-second Annual Meeting of the New York State Pharmaceutical Association was held at Newburgh, June 26–29, 1900, in five sessions. Felix Hirseman, of New York, was elected President; Judson B. Todd, of Ithaca, Secretary. Interesting reports were received from the Committee on Adulteration and on New Remedies.

The following papers were read:

"The New York State Pharmaceutical Association," by Clay W. Holmes.

"Prescription Incompatibilities as they Occur in Every-Day Practice," by William J. Robinson.

"Tendencies in Pharmacy," by Alfred B. Huested, M. D.

"Shop Notes and Dispensing Hints," by W. A. Dawson.

"Botanical Nomenclature," by Walter Bryan.

"The Medical Relief System of Buffalo," by Geo. Reiman.

"Formulas and Counter Specialties," by Clark S. Ingraham.

Note.—In last year's report (Proceedings 1900, p. 383) the reporter stated that "No papers on pharmaceutical topics were read at this meeting." This was an error into which he was led by the belief that the Report of the Committee on Pharmacy and Queries was the last appendage to the minutes of the meeting. The papers read at the Twenty-first Annual Meeting were the following:

"List of New Remedies," by a Committee.

"Assay of Some Samples of Fowler's Solution," by Prof. George A. Ferguson and Raymond J. Nestell.

"Some Official Plants that are a Nuisance to the Agriculturalist," by Chas. H. Meyer.

"The Determination of the Efficacy of Drugs by the Physiological Method where Chemical Methods are Unavailable," by F. T. Tuthill.

"On the Transformation of Calomel into Corrosive Sublimate," by George C. Diekman.

"The Antidote Cabinet," by William C. Alpers.

North Carolina.—The twenty-second Annual Meeting of the North Carolina Pharmaceutical Association was held at Wilmington, July 18 and 19, 1900, in four sessions. R. H. Jordan, of Charlotte, was elected President; T. W. Vaughan, of Durham, Secretary. An interesting address was delivered by Simon N. Jones, President of the National Association Retail Druggists.

The only paper read was

"The Venus Fly Trap," by William Niestlie.

North Dakota.—The Fifteenth Annual Meeting of the North Dakota State Pharmaceutical Association was held at Fargo, August 7–9, 1900, in three sessions. J. M. S. Wilser, of Fargo, was elected President; W. S. Parker, of Lisbon, Secretary and Treasurer. Trade interests seem to have occupied the time of the Association mainly at these sessions.

Ohio.—The Twenty-second Annual Meeting of the Ohio State Pharmaceutical Association was held at Put-in-Bay, June 19–21, 1900, in four sessions. R. S. Young, of Ada, was elected President; Lewis C. Hopp, Permanent Secretary.

The following papers were read:

"The Next Step," by Prof. Feil.

"What Constitutes a Good Member," by J. H. Von Stein.

(A "third" paper is mentioned, but for some reason, not clear to the reporter, this is not contained in the printed Proceedings.)

Oklahoma.—The Tenth Annual Meeting of the Oklahoma Pharmaceutical Association was held at Shawnee, April 4 and 5, 1900. C. A. Dow, of Pond Creek, was elected President; F. M. Weaver, of Oklahoma City, Secretary. The following papers were read:

"What our Association Does for the Druggist," by F. B. Lillie.

"How are We to Increase Our Trade and Profit?" by J. C. Burton.

"Keeping Stock," by W. B. Wheeler.

"Some Preparations Profitable for Oklahoma Druggists to Make," by C. R. Miller.

Oregon.—No information obtained.

Pennsylvania.—The Twenty-third Annual Meeting of the Pennsylvania Pharmaceutical Association was held at Maple Park Springs Hotel, Ebensburg, June 26–28, 1900, in five sessions. Samuel K. Hammond, of West Chester, was elected President; Jacob A. Miller, of Harrisburg, Secretary. Interesting reports were received on Adulterations and on Botany. The following papers were read:

"Adornment of Drug Stores With Plants," by Prof. Henry Kraemer.

"Anti-Nostrum Prescriptions," by L. Emanuel.

"Book-keeping for Druggists," by C. H. LaWall.

"Commercial Training Course in Colleges of Pharmacy," by Prof. J. P. Remington.

"Condensed Milk," by F. E. Niece.

"Gasometric Analysis," by Prof. F. X. Moerk.

"Laboratory Notes," by C. H. La Wall.

"Powder Folders," by I. M. Weills.

"Should Physicians be Charged for Urinary Analysis?" by F. T. Gordon.

"Shall the Pharmaceutical Press be Throttled?" by

"South Africa," by Prof. C. B. Lowe.

"Unprofitable Proprietary Articles," by J. F. Patton.

"White Wax," by Prof. H. C. C. Maisch.

"Zinc Ointment," by J. F. Patton and D. J. Thomas.

Rhode Island.—No information obtained.

South Carolina.—The Twenty-fourth Annual Meeting of the Pharmaceutical Association of the state of South Carolina was held at Charleston, May 17, 1900, in a single session. O. Y. Owings, of Columbia, was elected President; Frank M. Smith, of Charleston, Secretary and Treasurer. Routine business only appears to have been transacted.

South Dakota.—The Fifteenth Annual Meeting of the South Dakota Pharmaceutical Association was held at Brookings, August 7–9, 1900, in three sessions. N. R. Gilchrist, of Wakonda, was elected President; E. C. Bent, of Dell Rapids, Secretary. Prof. F. J. Wulling, of the University of Minnesota, delivered an address on "The Higher Education of Pharmacists," and Prof. Oldberg, of the Northwestern University School of Pharmacy, an address on "The Model Pharmacy Law" and Prof. Sheppard, of Brookings College, an address on "Technical Education of the Pharmacist."

Tennessee.—The Fifteenth Annual Meeting of the Tennessee State Druggists' Association was held at Kingston Springs, July 18 and 19, 1900, in three sessions. Ernest Hawkins, of Huntingdon, was elected President; R. W. Vickers, of Murfreesboro, Secretary. The following papers were read:

"Some Points About Prescriptions," by Edsel A. Ruddiman.

"What is the True Cause of the Seeming Apathy of the Druggists of this State with Regard to Both local and State Associations?" by R. C. Stockton.

"How Can We Amend Our Pharmacy Law to Increase Its Practical Benefits?" two papers, by Ernest Hawkins and H. W. McDonald.

Texas.—The Twenty-first Annual Meeting of the Texas Pharmaceutical Association was held at Dallas, May 15–17, 1900. J. L. Hazlett, of Hearne, was elected President; R. H. Walker, of Gonzales, Secretary.

Utah.—No information obtained.

Vermont.—The Seventh Annual Meeting of the Vermont State Pharmaceutical Association was held at Rutland, September 19th and 20th, 1900.

Washington.—No information obtained.

West Virginia.—No information obtained.

Wisconsin.—The Twentieth Annual Meeting of the Wisconsin Pharmaceutical Association was held at Waupaca, September 4th to 6th, 1900, in five sessions. J. H. Kamps, of Appleton, was elected President; Henry Rollmann, of Chilton, Secretary.

The following papers were read:

"On Methylic Alcohol," by A. F. Menges.

"What Benefit is it to Druggists to Form County Druggists' Societies?" by S. M. Reinhardy.

"Photographic Supplies as a Side Line," by D. A. Taylor.

"Practical and Theoretical Education," by Jos. Hammel.

"Paris Green," by Otto J. S. Boberg.

"Working Formula for Peptonates and their Combinations," by E. G. Raeuber.

"The Most Attractive Way of Trimming a Window in a Pharmacy," by E. W. Sacksteder.

"A Short and Concise Tablet for Urinary Analysis for Use of Busy Druggists," by Herman L. Emmerich.

"Hints in Prescriptioning," by H. L. Emmerich.

"The National Formulary," by Henry C. Peters.

"On Sunday Closing," by Edw. Williams.

"What Benefit is it to a Pharmacist to Attend the Meetings of the Associations?" by A. A. DuMez.

"Wisconsin Medicinal Plants," by R. H. Denniston.

"How Can We Best Dispose of the Evil of Adulteration of Drugs?" by ? .

"To Make the Soda Fountain Pay," by Julius Koepenik.

"How Should a Retail Druggist Advertise His Business?" by E. W. Sacksteder.

"How to Increase the Sale of Perfume," by C. J. Sacksteder.

"How to Prevent Substitution," by H. G. Thompson.

"How Can a Druggist Increase His Sales Through the Use of a Jones Excelsior Mixer and Sifter?" by W. A. Melcher.

"How Should Druggists Observe Sunday?" by Julius M. Farnsworth.

"Formula for Syrupus Ferri Iodidi," by John Baldwin.

"What Fluid Extracts are Best Prepared from the Fresh or Green Drug?" by John Baldwin.

Pharmacopœias and Formularies.

The British Pharmacopœia—A Standard Only in a Restricted Sense.—D. B. Dott discusses the direction in which he conceives the B. P. should be considered a standard. It is admittedly the standard according to which chemists are bound to prepare all medicines which are official; but even this simple statement requires qualification, since the medicines must only be of official standard when they are dispensed to the order of the physician, or when the conditions and circumstances of sale imply that they are of pharmacopœial standard. He furthermore contests the idea that because the Pharmacopœia states that a certain amount of ingredients is to be used in making a preparation, an analyst is to certify that he has made a calculation, and does not find the amount in it some time after it has been made. If the Pharmacopœia does not state the strength, the analyst is not authorized to make one. The important factor of deterioration must be considered, and it is to be regretted that in some cases, such as spirit of nitrous ether, for example, a minimum standard should not have been fixed. The author gives a number of examples of confused interpretations of the B. P. standard of public analysts, in which the application of a little common sense by the latter would have avoided troublesome litigation and annoyance. — Trans. Brit. Pharm. Conf., 1900, 490–493.

The B. P. as a Standard—Important Definition.—E. M. Holmes observes that in the preface to the British Pharmacopœia it should be distinctly stated that it is to be regarded as *a standard for drugs and their preparations used in dispensing medicines only*. There are many preparations which are not used in dispensing alone, but are used as veterinary remedies or for other purposes, and particularly for technical purposes, for which they would be too expensive if the B. P. standard of purity is insisted on.—Pharm. Journ., Jan. 12, 1901, 30.

The British Pharmacopœia—Observations Concerning its Chemistry.—Dr. Frederick B. Power makes some interesting observations on the chemical description of a large number of substances in the new British Pharmacopœia (1898), in which he points out numerous errors that have come to his notice in the course of a necessarily restricted perusal of that work. His inspection seems to indicate that the errors are more numerous than one might reasonably expect in a work of a national character, the more so since some of them might have been avoided by reference to standard works or the current literature, or even by simple experiments. The Committee of Revision of the United States Pharmacopœia have long recognized the value of observations or criticisms pointing out defects or improvements in the official descriptions and formulas, and has accordingly gratuitously published from time to time a "Digest of Criticisms," embodying such observations, for the convenience of the medical and

pharmaceutical bodies, and all others interested in the work; but in Great Britain such work has at best been only fragmentary. In the broad spirit of giving an initiative to such a work, Dr. Power has communicated his present paper, which embraces a long list of subjects in which he has detected errors and gives such observations concerning them as he has been able to gather from the current literature. The subjects so considered number more than sixty, and embrace organic and mineral acids, alkaloids, ethers, volatile oils, and saline compounds in large variety, which may be consulted with profit in Trans. Brit. Pharm. Conf., 1900, 316–353.

Victorian Pharmaceutical Formulary of Unofficial Preparations.—Compiled under the authority of the Pharmaceutical Society of Australasia for use in Victoria, with the object of securing uniformity in dispensing.

The following suggestion is also made by the society: Avoid making use of fancy or coined names, such as tabloid for tablet, lanoline for wool fat, hazeline for witch hazel, vaseline for petroleum jelly, etc. This avoids monopoly by any one firm, and all these preparations are made of official or other recognized standard by different firms. The letters "*P. F.*" and "N. F." following some of the formulas denote that they have been taken from the "Pharmaceutical Formulas" published by the "Chemist and Druggist" and the "National Formulas," respectively.

Syr. Hypophos. Co.—Calcii hypophos., ℥i, gr. iv; Potass. hypophos., ℥ii, gr. viii; Sod. hypophos., ℥ii, gr. viii; Strychninæ hydrochl., gr. iv; Ferri pyrophos., ℥i; Quin. hydrochlor., gr. xxxii; Sacch. alb. xtal, *q. s.* Dissolve the first three ingredients in the smallest quantity of cold water and the ferri pyrophos. in ℨi of warm water; mix the solutions and filter through kaolin. Dissolve the quin. HCl and strych. HCl in ℨi diluted alcohol. Make a strong syrup to allow for solutions, and clarify by white of an egg or felt filtering bag (and kaolin), and add enough to produce ℥lxiv of syr.

Syr. Quininæ Hydrobrom.—Quininæ hydrobrom., gr. lxxx; Ac. hydrobrom. dil., ℥iii; Syrup aurantii (B. P. 1898), ad ℨx. Dose, ℥i to ℥ii in water.

Mist. Pepsinæ Co. c. Bismutho.—Pepsin (scales 1-3000). gr. cclvi; Tr. nucis vom. (B. P., 1898), x, ♏xl; Ac. hydrocyan. dil., ℥iv, ♏xvi; Liq. carmini, ℨss; Aq. puræ, ℨviii; Liq. bismuthi, ad ℨxvi. Dissolve the pepsin in the water, and add the liq. carmini last. Filter per talc if necessary. Each ℥i dose contains: Pepsin, gr. ii; Tr. nuc. vom., ♏v; Ac. hydrocyan. dil., ♏ii. Dose, ℥ss to ℥i in water. N. B. Liq. carmini must be filtered perfectly bright before use.

Liq. carmini.—Carmine, gr. xx; Liq. ammon. fort, ♏xx; Glycerin, ℥i; Alcohol, 90 vel. sp. v. rect., ℥i; A, aq. ℨi. Dissolve carmine in water and ammonia, filter, and add glycerin last.

Liq. Pepticus. — Pepsin (scales 1–3000), ℥iv; Ac. hydrochlor, dil., ℥iii; Glycerin, ℨiii; Alcohol (90 per cent.), ℨi; Ess. rennet, ℨviii; Aq., ad ℨxx. Dose, ℥i. Filter through talc if necessary.

Essentia Rennet. — Rennet (freed from salts and chopped fine), ℨvi; Salt, ℨiv; Alcohol, 90 or s. v. rect., ℨx; Aq., ad ℨxl. Macerate four days, add vin. xericum ℨv. After a day or two strain, and then add, Glyc. ac. tannic, gtt. x; Fuller's earth, ℨi. Shake and set aside for a week. Decant clear sol. and filter the sediment.

Vin. Pepsinæ.—Pepsin (scales 1–3000), gr. cxxviii; Glycerin, ℨi; Acid. hydrochlor.

fort.), ℥ ss; Vin. xerici., ad ℥ xvi. Mix the water, glycerin and acid. Add the pepsin, and when dissolved add enough wine to make ℥ xvi. Filter through talc.

Liq. Euonymin c. Pepsin. — Tr. euonymi., ℥ ii ss; Pepsin. (scale 1–3000), ℥ iv; Ac. hydrochlor. dil., ℥ iii; Glycerin, ℥ iii; Aq., ad ℥ xx. ℥ i for a dose. N. B. — Tr. euonymi.

Cort. rad. euonymi, 4 ozs; Alcohol, 90 vel. s. v. r., ad ℥ xx. (Bark in 20 powder, and percolate.

Mist. Tussi Rub. Conc. — Ac. hydrobrom., ♏ xv; Tr. chlorof. et morphinæ (B. P. 1898), ♏ vi; Liq. carmini, ♏ ii; Ac. hydrocyan. dil., ♏ i; Syr. pruni virg., ad ℥ i;. Dose, ℥ i. to ℥ ii. N. B.—Let stand for a day, then filter through paper.

Liq. Copaibæ (Soluble) P. F. — Balsam copaibæ. ℥ xx; Liq. potassæ, ℥ xxx; Aq. ad ℥ x. Boil copaiba and potash for an hour; add the water and mix thoroughly; set aside till cold and well separated; draw off clear liquid from upper oily portion and sediment, and evaporate to ℥ xxxviii; add liq. potass. ℥ ii.

Mist. Bromoformi, P. F.—Bromoform, ♏ xvi; Alcohol 90 vel. s. v. r., ℥ ii; Tr. card. co., ℥ ii; Glycerini, ℥ iss. Dose (to be gradually increased): ℥ i every four hours for whooping cough of children one to three years of age.

Elixir Calisaya, N. F.—Tr. cinchonæ, ℥ iii; Syr. simp., ℥ iiss; Glycerin, ℥ iiss; Syr. aromat., ℥ xx. Mix and filter through a wet paper filter.

Liq. Santal Flav. Co. (Soluble), P. F.—Ol. santal flav., ℥ ii; Ol. cubebæ, ℥ i; Ol. copaibæ, ℥ vi; Ol. pimentæ, ℥ ss; Ol. cassiæ, ℥ ss; Tr. buchu, ℥ vi; Inf. buchu conc. (1 to 7), ℥ vi; Alcohol 90 vel sp. v. rect., ℥ viii; Liq. potassæ, ℥ vi; Mag. carb. levis, ℥ i; Aq. dest., ℥ iii. Boil the liq. potassæ and mix with the oils, and stand two days; add the water, and shake well (if not saponified, boil up with a little more KOH), when cold, add tinct., inf. and alcohol, add mag. carb.; mix well, and in twenty-four hours filter through filter paper sprinkled well with mag. carb.

Emulsio Ol. Morrhuæ (C. Hypophosphitibus, Ovis et Vino.)—Ol. morrhuæ, ℥ viii; Ovi. vitelli, ii; P. tragacanth, gr. viii; Liq. saccharini, 5 per cent., ℥ i; Tr. benz. simp., ℥ i; Sp. chlorof., ℥ iv; Ol. amygd. ess., ♏ viii; Sodii hypophos., Calcii hypophos., āā ℥ i; Vin xerici, q. s., ad ℥ xvi. Place tragacanth in dry mortar, rub with a little oil, then add the yolks of eggs (previously beaten), stir briskly, add wine and oil alternately until quantity is made up. Dissolve the hypophosphites in the wine. N. B. Can be dispensed at counter in fifteen minutes.

Liq. Thymol Co. (Listerine).—Thymol, ℥ ii; Ac. benzoic, ℥ vi; Eucalyptol, ℥ ss; Ol. gaultheriæ, ♏ xx; Menthol, ℥ i; Solve in alcohol 90 vel sp. vini rect., ℥ xx; Aq. puræ, ad ℥ c; Solve in aq., Sod. bibor., Ac. boric, āā ℥ i. Stand for a few days, then filter through talc.

Liq. Opii Sed.—Opium 10 per cent., ℥ ii; Slaked lime, ℥ ii; Spt. vini. rect., ℥ iv; Sherry wine, ℥ iii; Aq., q. s. Boil the opium (broken into small pieces) and lime in 15 oz. of water for half an hour, and allow to cool. Make up to 13 oz. with water; add the s. v. r. and sherry. Filter, press the marc, and add proof spirit to make ℥ xx. Set aside for six months to mature; filter. By letting it stand for the time mentioned the flavor and aroma are greatly improved.

Elixir. Cascaræ c. Glycerino.—Ext. cas. sag. liq., ℥ xxx; Ext. glycyrrh. liq., ℥ xxx; Glycerin ℥ xxv; Saccharin (soluble), gr. cclxxx; Ol. anisi., ♏ xx; Ol. menth. pip., ♏ xx; Ol. anethi, x; Ol. caryoph., ♏ x; Ol. cinnam., ♏ x; Alcohol 90 vel. sp. v. rect., ℥ i. Dissolve the oils in the spirit of alcohol, and add to other ingredients. Dose. ℥ i to ℥ ii as a laxative, or ℥ ss t. d. s. Syn., cascara aromatic.

Throat Sprays.—No. I. Iodi. (pur.), gr. i; Menthol, ℥ i; Ol. petrol. alb., ad ℥ i. Dissolve iodine in the oil by heat and add menthol while warm.

No. II.—Guaiacol, ♏ x; Menthol, ℥ i; Ol. petrol. alb., ad ℥ i.

No. III.—Cocaine (alk.), gr. x; Menthol, ℥ i; Ol. petrol. alb., ad ℥ i. Antiseptic

stimulant and sedative for inhalation in phthisis, and in excessive muco-purulent discharge from bronchial tubes.

No. IV.—Menthol, gr. xxx; Cocain. hyd., gr. v; Tr. benz. co., ʒi; Glycerin, ad ʒii. Sedative and demulcent, useful in bronchial congestion and irritation (acute or chronic), irritable cough generally.

No. V.—Cocain. hyd., gr. iii; Menthol, gr. x; Tr. aurant, ʒiii; Glycerin., ad ʒi. For hay fever, irritable catarrhal state of the pulmonary mucous membrane.

No. VI.—Ol. eucalypt., ♏xx; Thymol, gr. iii; Menthol, gr. xxv; Ol. gaultheriæ, ♏vii; Ac. boric, gr. vii; Glyc. ac. tannic, ʒiii; Alcohol 90 vel. sp. v. rect., ad ʒii. For relaxed sore throat, granular pharyngitis and chronic laryngitis and loss of voice, and all throat troubles.

—Pharm. Journ., March 16, 1901.

The Revised "B. P. C." Formulary, 1901.—In the new (sixth) edition of the "Formulary" published by the British Pharmaceutical Conference, forty-two new preparations are added, and forty-nine preparations—which appeared in the 1894 edition of the British Pharmacopœia, and have not been included in that of 1898—are reproduced with sundry modifications. Commenting on this revised edition of the "B. P. C." Formulary, the Pharmaceutical Journal (April 27, 1901, says that "it is a great improvement upon its predecessors, and the compilers must be congratulated upon having gone a little farther than formerly in the direction of providing a work which may in time come to be generally recognized as a supplement to the British Pharmacopœia. An important step, which involves a question of principle, has been taken by including in the Formulary two preparations—tinctura chloroformi composita and tinctura zingiberis fortior—which were formerly official in the British Pharmacopœia. Both were excluded from the latter work without sufficient justification, and their inclusion in the Formulary provides pharmacists with formulæ, which would otherwise have lacked recognition." In the following summary, all the preparations included in the new Formulary are given, but working formulas are omitted. It is noted in connection with each preparation whether the formula is new, altered, or unaltered:

Acidum Hydrocyanicum (*Scheele*) is a 4 per cent. solution. S.g. 0.994. Dose: 1 to 3 minims. [*Unaltered.*

Acidum Hydrofluoricum Dilutum contains 0.20 per cent. of hydrofluoric acid. Dose: 5 to 20 minims. [*New.*

Acidum Hypophosphorosum is prepared from barium hypophosphite. S.g. 1.1367. Dose: 2 to 5 minims. [*Unaltered.*

Caffeinæ Hydrobromidum Effervescens is a granular preparation containing about 4 per cent. of caffeine hydrobromide. Dose: 60 to 120 grains. [*New.*

Chloral Camphoratum consists of equal parts of camphor and chloral hydrate. [*Unaltered.*

Chloroformum Aconiti (1 in 1.5) is prepared by macerating bruised

aconite root with solution of ammonia, then drying, powdering and percolating with chloroform. [*Unaltered.*

Chloroformum Belladonnæ (1 in 1.5) is prepared in the same way as Chloroformum Aconiti. [*Unaltered.*

Chloroformum Camphoratum is prepared by dissolving camphor, 2, in chloroform, 1. [*Unaltered.*

Collodium Belladonnæ, or Emplastrum Belladonnæ Fluidum, is a solution of alcoholic extract of belladonna leaf, camphor and pyroxylin, in a mixture of equal parts of 90 per cent. alcohol and ether (s. g. 0.72). It contains 44 grains of the alkaloids of belladonna leaf in 1 pint. [*Altered.*

Collodium Stypticum is a solution of benzoin and tannic acid, in absolute alcohol, to which a solution of pyroxylin in ether has been added. [*Unaltered.*

Elixir Aletridis is a mixture of the liquid extracts of aletris and liquorice, with tincture of orange, syrup and distilled water. Dose: ½ to 1 fluid drachm. [*New.*

Elixir Glusidi, or Elixir Saccharini, contains three grains of gluside (saccharin) in each fluid drachm. Dose: 5 to 20 minims. [*Unaltered.*

Injectio Curare Hypodermica contains 5 grains of curare in 1 fluid drachm. Dose: 1 to 6 minims. [*Unaltered.*

Iridinum is extracted from the rhizome of *Iris versicolor*, Linné, by means of 60 per cent. alcohol. Dose: 1 to 3 grains. [*New.*

Linimentum Opii Ammoniatum consists of liniment of soap, ammoniated liniment of camphor, tincture of opium (6 in 20), liniment of belladonna, and strong solution of ammonia. [*Unaltered.*

Liquor Bismuthi Concentratus is prepared by dissolving 7 ounces of bismuth in diluted nitric acid, then adding a solution of citric acid, precipitating with solution of sodium bicarbonate, dissolving the precipitate in solution of ammonia and, finally, adding solution of ammonium citrate and sufficient distilled water to produce 2½ pints. [*New.*

Liquor Bromo-Chloral Compositus contains 10 grains each of chloral hydrate and potassium bromide in each fluid ounce, together with tinctures of Indian hemp and fresh orange peel, juice of henbane, syrup and liquid extract of liquorice. Dose: ½ to 2 fluid drachms. [*Unaltered.*

Liquor Ferri Hypophosphitis Fortis contains iron equal to 40 grains of ferric hypophosphite in each fluid ounce. Dose: 10 to 30 minims. [*Altered.*

Liquor Hypophosphitum Compositus, or *Liquor Ferri Hypophosphitis Compositus*, contains in each fluid drachm about 2 grains each of sodium and calcium hypophosphites, 1 grain of magnesium hypophosphite and 1.5 grain of ferric hypophosphite. Dose: ½ to 2 fluid drachms. [*Altered.*

Mistura Bismuthi Composita contains in each fluid drachm 2 minims of

diluted hydrocyanic acid, $\frac{1}{20}$ grain of morphine hydrochloride, and the equivalent of 5 minims of tincture of nux vomica, together with compound tincture of cardamoms, chloroform and 15 fluid ounces of concentrated solution of bismuth in the pint. Dose: 20 to 30 minims. [*New.*

Phenacetinum cum Caffeina Effervescens contains about 5 per cent. of phenacetin and 2.5 per cent. of caffeine citrate. Dose: 60 to 120 grains. [*New.*

Phenazonum Effervescens contains about 8 per cent. of phenazone. [*New.*

Pulvis Acetanilidi Compositus consists of: acetanilid, 7; caffeine, 1, and sodium bicarbonate, 2. Dose: 3 to 5 grains. [*New.*

Pulvis Salis Carolini Factitii Effervescens contains sodium sulphate (exsiccated), chloride and bicarbonate, potassium sulphate, tartaric acid gluside. Dose: 60 to 120 grains. [*New.*

Succus Digitalis is prepared by bruising fresh digitalis leaves, pressing out the juice, and adding 25 per cent. of 90 per cent. alcohol. Dose: 5 to 10 minims. [*New.*

Syrupus Acidi Hydriodici contains about 1 per cent. by weight of hydriodic acid. Dose: 20 to 60 minims. [*Unaltered.*

Syrupus Apomorphinæ Hydrochloridi contains 0.25 grain of apomorphie hydrochloride in each fluid ounce. Dose: ½ to 1 fluid drachm. [*Altered.*

Syrupus Butyl-Chloral Hydras contains 16 grains of butyl-chloral hydrate in each fluid ounce. Dose: 1 to 4 fluid drachms. [*Unaltered.*

Syrupus Calcii Hypophosphitis contains 1 grain of calcium hypophosphite in each fluid dracm. Dose: 1 to 4 fluid drachms. [*Unaltered.*

Sprupus Ferri Bromidi contains about 4.5 grains of ferrous bromide in a fluid drachm. Dose: ½ to 1 fluid drachm. [*Unaltered.*

Syrupus Ferri Bromidi cum Quinina contains 1 grain of quinine acid hydrobromide, and about 4 grains of ferrous bromide in each fluid drachm. Dose: ½ to 1 fluid drachm. [*Altered.*

Syrupus Ferri Bromidi cum Quinina et Strychnina contains $\frac{1}{64}$ grain of strychnine, 1 grain of quinine acid hydrobromide, and about 4 grains of ferrous bromide in each fluid drachm. Dose: ½ to 1 fluid drachm. [*Altered.*

Syrupus Ferri Hypophosphitis contains about 1 grain of ferric hypophosphite in each fluid drachm. Dose: ½ to 2 fluid drachms. [*Unaltered.*

Syrupus Ferri Phosphatis Compositus contains about ½ grain of iron phosphate, $\frac{4}{5}$ grain of calcium phosphate, and small quantities of potassium and sodium phosphates in each fluid drachm. It is colored with cochineal. Dose: ½ to 2 fluid drachms. [*Unaltered.*

Syrupus Glycerophosphatum Compositus contains in each fluid ounce, 8

grains of calcium glycerophosphate, 4 grains each of potassium, sodium, and magnesium glycerophosphates, 2 grains of iron glycerophosphate in scales, 1.5 grain of citric acid, 4 grains of caffeine citrate, and $\frac{1}{10}$ grain of strychnine hydrochloride. It is colored with a decoction of cudbear, and contains, as preservatives, 1 minim of chloroform, and 2 minims of 90 per cent. alcohol in each fluid ounce. Dose: 1 to 2 fluid drachms. [*New.*

Syrupus Hypophosphitum Compositus contains, in each fluid drachm, $\frac{1}{160}$ grain of strychnine, and $\frac{1}{8}$ grain of quinine hypophosphite, together with calcium, manganese, potassium and ferric hypophosphites. In this case also chloroform and alcohol are added as preservative agents. Dose: ½ to 2 fl. drachms. [*Altered.*

Syrupus Ipecacuanhæ Aceticus is prepared by dissolving sugar in vinegar of ipecacuanha. S.g. about 1.33. Dose: ¼ to 2 fluid drachms. [*Unaltered.*

Elixir Guaranæ (1 in 5) is prepared by percolating a mixture of powdered guarana and light magnesia, with 60 per cent. alcohol, then adding oil of cinnamon and syrup to the percolate. Dose: ½ to 2 fluid drachms. [*Unaltered.*

Elixir Phosphori is a mixture of compound tincture of phosphorus and glycerin. Each fluid drachm contains $\frac{1}{50}$ grain of phosphorus. Dose: 15 minims to 1 fluid drachm. [*Unaltered.*

Elixir Rhei (1 in 4) is prepared by macerating powdered rhubarb root and bruised fennel fruits in a mixture of alcohol and water, then adding sugar and glycerin. Dose: 1 to 3 fluid drachms. [*Unaltered.*

Elixir Saccharini is the same as Elixir Glusidi. [*Unaltered.*

Elixir Sennæ (1 in 1.5) is prepared by macerating Alexandrian senna in a mixture of alcohol and water, then adding sugar and—after heating to 200° F. and cooling—a mixture of chloroform, oil of coriander, tincture of capsicum, and 90 per cent. alcohol. Dose: 1 to 3 fluid drachms. [*Unaltered.*

Emplastrum Belladonnæ Fluidum is the same as Collodium Belladonnæ. [*Altered.*

Emplastrum Belladonnæ Viridi is a mixture of alcoholic extract of belladonna leaf and resin plaster, containing 0.25 per cent. of the alkaloids of belladonna leaf. It is just half the strength of Emplastrum Belladonnæ, B. P. [*New.*

Emulsio Olei Morrhuæ contains 50 per cent. by volume of cod liver oil, emulsified by means of the yolk of egg and powdered tragacanth. It also contains elixir of gluside, simple tincture of benzoin, spirit of chloroform, and essential oil of bitter almonds. Dose: 2 to 8 fluid drachms. [*Unaltered.*

Emulsio Petrolei cum Hypophosphitibus contains one-third its volume of

liquid paraffin, emulsified by means of powdered acacia and tragacanth. It also contains calcium and sodium hypophosphites, and is flavored with oil of cinnamon. Dose: 1 to 4 fluid drachms. [*New.*

Extractum Aletridis Liquidum (1 in 1) is prepared by percolating the powdered rhizome and rootlets of *Aletris farinosa*, Linné, with 45 per cent. alcohol. Dose: 5 to 15 minims. [*New.*

Extractum Belladonnæ Folii Alcoholicum is prepared by percolation with 90 per cent. alcohol. An assay process is now given, but no alkaloidal strength is specified. [*Unaltered.*

Extractum Cascaræ Sagradæ Liquidum Insipidum (1 in 1) is prepared by mixing the powdered cascara with light magnesia, macerating with water, then drying and percolating with 60 per cent. alcohol. Dose: ½ to 2 fluid drachms. [*New.*

Extractum Condurango Liquidum (1 in 1) is prepared by percolation with 60 per cent. alcohol. Dose: 10 to 60 minims. [*New.*

Extractum Conii Liquidum is prepared by percolation with acetic acid and 60 per cent. alcohol. It contains alkaloids equivalent to 1 per cent. of alkaloidal hydrochlorides. Dose: 5 to 15 minims. [*New.*

Extractum Damianæ Liquidum (1 in 1) is prepared by percolation with 60 per cent. alcohol. Dose: ½ to 1 fluid drachm. [*New.*

Extractum Eucalypti Gummi Liquidum, or Liquid Extract of Red Gum (1 in 4), is a solution of red gum in distilled water, to which 90 per cent. alcohol is added. Dose: 30 to 60 minims. [*New.*

Extractum Fuci Vesiculosi is a firm extract of *Fucus vesiculosus* prepared by exhausting the drug with 45 per cent. alcohol. Dose: 3 to 10 grains. [*New.*

Extractum Fuci Vesiculosi Liquidum is a solution of the firm extract (1 in 5) in 45 per cent. alcohol. Dose: 1 to 2 fluid drachms. [*New.*

Extractum Hæmatoxyli Liquidum (1 in 1) is prepared by boiling unfermented logwood with water and adding 90 per cent. alcohol to the strained liquors. Dose: ½ to 2 fluid drachms. [*Altered.*

Extractum Kolæ Liquidum (1 in 1) is prepared by exhausting the drug with 60 per cent. alcohol. Dose: 10 to 20 minims. [*New.*

Extractum Malti is prepared from freshly-crushed barley malt. Tests are given. Dose: 1 to 4 fluid drachms. [*New.*

Extractum Malti cum Oleo Morrhuæ contains 15 per cent. by volume of cod-liver oil. Dose: 1 to 4 fluid drachms. [*New.*

Extractum Sennæ Leguminorum Liquidum (1 in 1) is prepared by macerating bruised senna pods with a mixture of 90 per cent. alcohol and water. Dose: 1 fluid drachm. [*New.*

Gelatinum Zinci (1 in 10) is prepared by rubbing zinc oxide with

glycerin until quite smooth, and then adding a solution of gelatin in distilled water. [*New.*

Glycerinum Belladonnæ (1 in 2) is prepared by rubbing extract of belladonna into a smooth paste with boiling distilled water, and then adding glycerin. [*Unaltered.*

Hydrastinum is extracted from powdered hydrastis rhizome with 60 per cent. alcohol. Dose ½ to 2 grains. [*New.*

Infusum Digitalis Concentratum (1 to 20) is prepared by exhausting powdered digitalis leaves with distilled water, and adding 90 per cent. alcohol. It is eight times the strength of infusum digitalis, B. P. Dose: 15 to 30 minims. [*New.*

Infusum Gentianæ Compositum Concentratum (1 in 10) is prepared by exhausting gentian root and dried bitter orange and lemon peels with distilled water, then adding tincture of lemon peel and 90 per cent. alcohol. It is eight times the strength of Infusum Gentianæ Compositum, B. P. Dose ½ to 1 fluid drachm. [*New.*

Syrupus Picis Liquidæ is prepared by mixing 1½ ounce of tar with white sand, washing well with distilled water, then macerating with boiling water and glycerin, adding sugar to the clear filtrate, and making the product measure 1 pint. Dose: 1–2 fluid drachms. [*New.*

Syrupus Sodii Hypophosphitis contains 1 grain of sodium hypophosphite in each fluid drachm. Dose: 1 to 4 fluid drachms. [*Unaltered.*

Tinctura Antiperiodica, or Warburg's Tincture is made similarly to the N. F. preparation, but a stronger menstruum is employed (60 per cent. alcohol), and each fluid ounce contains ⅛ grains of opium, 8.75 grains of of quinine sulphate, and 1 grain of camphor. Dose: 1 to 4 fluid drachms. [*New.*

Tinctura Benzoini Simplex (1 in 10) is prepared by maceration with 90 per cent. alcohol. [*Unaltered.*

Tinctura Bryoniæ is prepared by macerating fresh bryony root in 90 per cent. alcohol, adding water so as to reduce the alcohol to 60 per cent., and producing a tincture of such strength that 10 fl. ozs. shall represent 1 oz. of the dried root. Dose: 1 to 10 minims. [*Unaltered.*

Tinctura Calendulæ Florum (1 in 5) is prepared by percolation with 60 per cent. alcohol. Dose: 5 to 20 minims. [*Unaltered.*

Tinctura Capsici Fortior (1 in 3) is prepared by percolation with 90 per cent. alcohol. Dose: 1 to 3 minims. [*Unaltered.*

Tinctura Carminativa is prepared by macerating cardamom seeds in 90 per cent. alcohol, adding stronger tincture of ginger to the resulting tincture, and dissolving oils of cinnamon, caraway and cloves in the mixture. Dose: 2 to 10 minims. [*Unaltered.*

Tinctura Chloroformi Composita is a mixture of chloroform, 2; alco-

hol (90 per cent.), 8; and compound tincture of cardamom, 10 parts. Dose: 5 to 60 minims. [*Formerly in B. P.*

Tinctura Convallariæ (1 in 8) is prepared by percolating the dried flowers and stalks with 90 per cent. alcohol. Dose: 5 to 20 minims. [*Unaltered.*

Tinctura Coto (1 in 10) is prepared by maceration with 90 per cent. alcohol. Dose: 10 to 30 minims. [*Unaltered.*

Tinctura Eucalypti (1 in 5) is prepared by percolation with 90 per cent. alcohol. Dose: 15 minims to 2 fluid drachms. [*Unaltered.*

Tinctura Euonymi (1 in 5) is prepared by percolating the bark with 90 per cent. alcohol. Dose: 10 to 40 minims. [*Unaltered.*

Tinctura Euphorbiæ Piluliferæ (1 in 5) is prepared by percolation with 60 per cent. alcohol. Dose: 10 to 30 minims. [*Unaltered.*

Tinctura Guaiaci (1 in 5) is prepared by dissolving the resin in 90 per cent. alcohol. Dose: ½ to 1 fluid drachm. [*New.*

Tinctura Iodi Decolorata (12.5 grains in 1 fl. oz.) is prepared by solution in 90 per cent. alcohol and decolorizing with strong ammonia water. [*Unaltered.*

Tinctura Lobeliæ (1 in 8) is prepared by percolation with 60 per cent. alcohol. Dose: 10 to 30 minims. [*New.*

Tinctura Phosphori Composita ($\frac{1}{10}$ grain in fluid drachm) is prepared by dissolving phosphorus in chloroform and adding absolute alcohol. Dose: 3 to 12 minims. [*Unaltered.*

Tinctura Physostigmatis (1 in 5) is prepared by percolation with 90 per cent. alcohol. Dose: 5 to 15 minims. [*New.*

Tinctura Pulsatillæ (1 in 10) is prepared by percolating the powder with 60 per cent. alcohol. Dose: 1 to 5 minims, or more. [*New.*

Tinctura Valerianæ (1 in 8) is prepared by percolation with 60 per cent. alcohol. Dose: 1 to 2 fluid drachms. [*New.*

Tinctura Veratri Viridis (1 in 5) is prepared by percolating the powdered rhizome with 90 per cent. alcohol. Dose: 5 to 15 minims. [*New.*

Tinctura Zingiberis Fortior, or "Essence of Ginger" (1 in 2) is prepared by percolation with 90 per cent. alcohol. Dose: 5 to 20 minims. [*Formerly in B. P.*

Unguentum Hydrargyri Mite (1 in 3) is prepared by diluting mercurial ointment with lard. [*New.*

Unguentum Oleo-Resinæ Capsici (1 in 5.5) consists of the oleo-resin, yellow wax and benzoated lard. [*Unaltered.*

Vinum Aurantii Detannatum is prepared by macerating gelatin with orange wine. [*Altered.*

Vinum Pepsini (16 grains in 1 fl. oz.) is prepared by rubbing pepsin

with glycerin and adding sherry wine acidulated with HCl. Dose: 1 to 2 fl. drachms. [*New.*

Vinum Xericum Detannatum is prepared by macerating sherry wine with gelatin. [*Altered.*

The following preparations formerly in the "B. P. C." formulary have been omitted in the present revised edition, because now official—more or less modified, in the B. P. or in the Indian and Colonial addendum:

Elixir Cascaræ Sagradæ.
Elixir Simplex.
Extractum Grindeliæ Liquidum.
Extractum Tritici Liquidum.
Liquor Picis Carbonis.
Pix Carbonis (Liquida) Preparata.
Syrupus Cascaræ Sagradæ (Aromaticus).
Syrupus Codeinæ.
Syrupus Ferri, Quininæ et Strychninæ Phosphatum.
Syrupus Pruni Virginianæ.
Tinctura Ergotæ Ammoniata.
Tinctura Erythrophloei.
Tinctura Prunis Virginianæ.
Unguentum Hydrargyri Oleati.

PHARMACY.

A. Apparatus and Manipulations.

Weights, measures, specific gravity.

Apothecaries' Weights and Measures—Adaptation to the Metric System.—C. S. N. Hallberg proposes an adaptation of apothecaries' weights and measures to the metric system, in the belief that its acceptance would be a great aid for the calculation of doses, the strength of preparations, etc., on the basis of weights and measures that have become so thoroughly identified with common practice that it has so far resisted all efforts to displace it for what is known on the decimal system. In the proposed adaption, which is given in detail in the table, there are no changes whatever in the metric standards.

The new metric grain proposed is about one-fifth less than the troy grain. The minim is a little less than one-fifth smaller.

The new drachm is about two-ninths greater than the apothecaries.

The new fluid drachm is about three-elevenths larger than the present fluid drachm.

Both drachms contain 100 grains or minims.

As is well known, the three ounces at present in use show this difference in the number of grains, each contains, viz.: apoth. or troy ounce, 480; fluid ounce, 456: av. ounce, 437.5 grains.

The new ounces would be all alike, representing 25 Gm. or Cc., and would be from one-eighth to one-fifth less than the customary ounces.

The metric ounce, 25.0; one-fifth less than 1 apoth. ounce, 31.0.

The metric ounce, 25.0; one-sixth less than 1 av. ounce, 28.35.

The metric fluid ounce, 25.0; two-thirteenths less than 1 fluid ounce, 29.5.

The discrepancy between weight and fluid measure is not great, and would be readily adjusted. Each would contain 20 ounces, or 100 drams, or 10,000 grains, or minims.

ADAPTATION OF APOTHECARIES' WEIGHTS AND MEASURES TO THE METRIC SYSTEM.

Showing by cross-references the relative quantities of customary denominations in Metric Terms, based on the Metric Standard Liter and Gram.

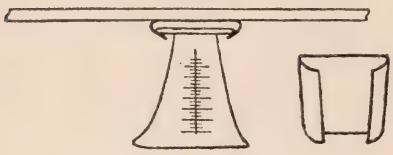
Decimal proportion to 1 (Gm.).	Denomination.	Minim drop grain.	Cubic Cm. Gram.	Fl. dram spoonful. Dram.	Centiliter. Tablespoonful. Dekagram.	Fl. oz. Ounce.	Deciliter. Fl. oz. Hektogram.	Semi-liter pint. Semi-kilogram pound.	Liter quart. Kilogram.	Abbreviations in order of preference.
0.001	milligram.	50	1,000	5,000	10,000	25,000	100,000	500,000	1,000,000	cg; ctg; 0.02... } These three denominations given only for reference.
0.01	centigram.	5	100	500	1,000	2,500	10,000	50,000	100,000	mg; 0.001 .... } These three denominations given only for reference.
0.1	decigram.	0.5	10	50	100	250	1,000	5,000	10,000	deg; dg; 0 .... } These three denominations given only for reference.
0.05	minim drop. grain.	1	20	100	200	500	1,000	10,000	20,000	m; mtm; min; gtt; 0.05 cc. gr. mtgr; 5 cg; 0.05.
1	cubic cm. Gram.	20	1	5	10	25	100	500	1,000	cc; cm^3; ccm; ml; 1cc. Gm; G; 1.0.
	fl. dram. dram.	100	5	1	2	5	20	100	200	fldr; flmd; flmtd; met. spoonful; met. cochl; 5 cc. mdr; mtd; mtdr; 5.0.
10	centiliter. Dekagram.	200	10	2	1	2.5	10	50	100	cl; ctlit; met; tablespoonful; met. cochl mag.; 10 Cc. Dkg; Dekag; 10.0.
25	fl. ounce. ounce.	500	25	5	2.5	1	4	20	40	mfloz; met. floz; quaddcl; 25 cc. moz; mtoz; quad Hkg; 25.0.
100	deciliter. Hektogram.	2,000	100	20	10	4	1	5	10	dcl; decilit; flHk; flquatuncia; 100 cc. Hk; Hkg; quatuncia; Four ounce; 100.0.
500	Semi-liter. Semi-kilogm.	10,000	500	100	50	20	5	1	2	Smlit; mpt; ½ L; 500 cc. Smkg; mtd; ½ K; 500.0.
1,000	Liter Kilogram.	20,000	1,000	200	100	40	10	2	1	L; mqt; 1,000 cc. K; Kg; 1,000.0.

This adaptation is based upon the fact that 20 drops of water at 15° C., delivered from a minimum pipette with an external diameter of 3 mm., will measure one Cc.

—West. Drugg., June, 1901, 292–293.

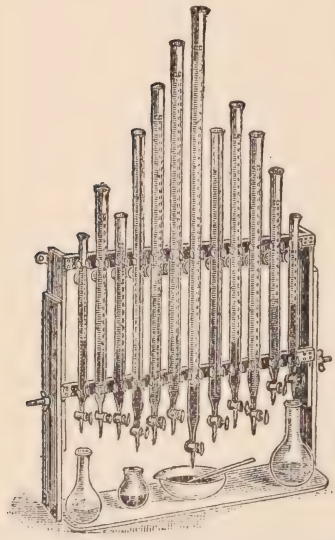
Graduates—A Simple Support.—Joseph F. Hostelley describes a simple device for supporting a graduate suspended from its base, which is shown by Fig. 1. It consists of a strip of metal (brass, tin or zinc) bent at either end into a sharp curve so that the strip will receive and retain the foot of a graduate when the metal is made fast to the under surface of a shelf in the manner shown in cut. A strip of metal to support a certain graduate should be a little wider than the diameter of the graduate base. If the ends of the strip are bent so that when the rack is in position the intervening space narrows toward the rear a trifle, this will prevent the graduate from entering the support too far. Such a graduate rack as this can be fashioned without a kit of tools and in a few minutes.—Amer. Drugg., Nov. 12, 1900, 275.

FIG. 1.



Graduated Test Tubes—A Desideratum.—F. H. Alcock calls attention to the uncertainty of results obtained, particularly by students, when directed to make a test in test tubes. These, varying in size, the quantity of a fluid to be tested may vary considerably and may not be in proper relation to the "drop" of reagent to be added. The quantities should therefore be specified, and the execution would be greatly simplified if graduated test tubes could be obtained, particularly if such could be cheaply constructed.—Chem. & Drugg., Sept. 8, 1900, 408.

FIG. 2.



Burette Stand.

New Burette Stand—Common-sense Construction.—W. Martindale has constructed the "common-sense" burette stand, shown in the accompanying sketch (Fig. 2), filled with burettes. It may be screwed to the bench or wall, and is provided behind each tube with a little hook to hold a small bone memorandum tablet. The rack may be elevated or lowered by means of thumb-screws provided in the slot on the uprights, as shown.—Chem. News., May 17, 1901, 240.

Specific Gravity—Its Relation to the Official Temperature.—Oswald Schreiner discusses the influence of temperature on specific gravity with the object of preparing the way for the adoption by the United States Pharmacopœia of an official temperature

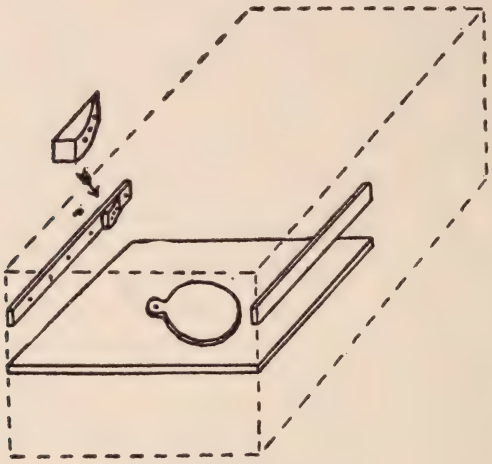
that is more practical and more likely to be adhered to in determining the specific gravity constants of official substances. After reviewing the numerous propositions that have been made in this direction, he observes that for practical work a temperature higher than 15° is generally conceded to be necessary, while one of 37° has been shown to be too high and to be objectionable for several reasons. The standard temperature ought to be kept as low as is consistent with room temperature; 20° has not given the author much difficulty and seems to him to be high enough, but if a higher temperature is desired, it should not go beyond 25°. In support of the availability of a temperature of 20°, which approaches most nearly to the average room temperature, the author mentions that a few degrees either way does not very materially affect the third decimal in the specific gravity of pharmacopœial substances, and when absolute accuracy is required this temperature can be more conveniently reached and maintained than that of 15°, while ordinarily tables of differences may be consulted and the necessary correction made. He has found that in a number of substances the differences for each degree of temperature are constant, and that it is therefore perfectly feasible to construct such table for the more important determinations. If, however, the specific gravity is to be determined as an accurate physical constant of a new chemical or pharmaceutical substance, to be used for the purpose of reference, the chemist or physicist will, of course, use the same precautions as to standard and constancy of temperature, etc., as he has already done. The practical conclusion arrived at by the author is, that it would be well if the United States Pharmacopœia of 1900 were to include under the heading of specific gravity more explicit directions and remarks than was done in 1890, and that there be given under this heading: 1. a table of density and volume of water for each degree from 0° to 35° and for every five degrees from 35° to 100°; 2. a table of the mean coefficients of expansion from 0° to 100° of the more common substances and an illustration showing how to use these tables in making reductions of specific gravity to any temperature, and, 3. a table giving the change in specific gravity of the pharmacopœial liquids for each degree between 15°–20° and 20°–25°, with illustration showing how the table was made and how it is to be used.—Pharm. Rev., Oct. 1900, 457–467.

COMMINUTION, SOLUTION, FILTRATION.

Mortars and Pestles—Convenience of Drawers.—Joseph F. Hostelley describes the arrangements shown by Figs. 3 and 4, the one for storing mortars and holding them in position when in use—the other for storing pestles conveniently. For the mortars, a long deep upper drawer (Fig. 3) is selected in the prescription counter or nearby fixtures, or a double drawer is utilized—two shallow ones being merged into one. In the forward part of the drawer, about one inch below the top, a platform of hard

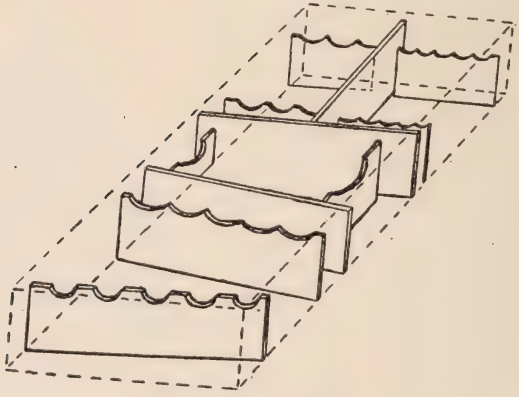
wood with a circular aperture cut in the centre, is placed on cleats. A few inches beneath this a similar platform of hard wood is affixed. The upper shelf is not to be secured permanently. The lower platform is made fast. The hole in the upper shelf is of such dimensions that a mor-

FIG. 3.



Support for Mortars.

FIG. 4.

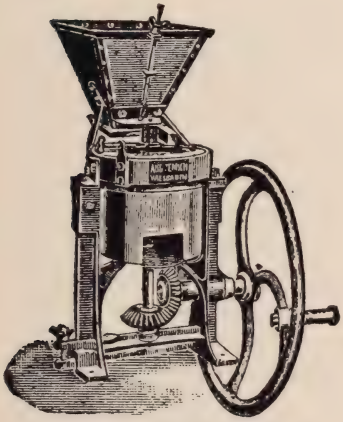


Support for Pestles.

tar of a size most frequently used can be snugly set into it, the bottom of the mortar resting on the lower platform. Thus the utensil is held more securely during trituration, and with less exertion than by the hand alone. Several trays to fit the drawer may be designed, with central apertures of varying dimensions to fit mortars of different sizes. These tray supports can be stored in the back of the drawer, as depicted in the first sketch. They are held on edge by cleats, on the side of the drawer, at an angle of

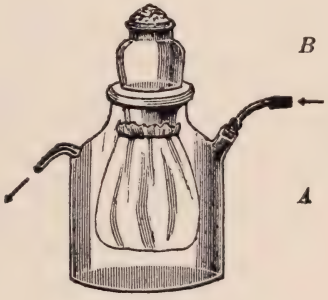
about 45 degrees. On the upper edge of each tray an arbitrary number appears which indicates, for instance, that No. 1 tray is to support No. 1 mortar. When the tray is in position, it cannot make a forward or lateral movement during trituration, because of the front and sides of the drawer, but, if not provided against, it may slip backward. To offset this contingency, on the side of one or both cleats which support the trays, a little bracket shaped block of wood is secured somewhere near the further end of the cleat; on the under surface of each tray, close to either edge, a strip of wood is affixed which, when the tray is in position, will rest against the cleats which support the latter and justify with the "stops," thus preventing the tray from moving toward the rear of the drawer when in service. Fig. 4 shows a model arrangement for the disposition of pestles of all sizes, the drawing conveying the ideas of the originator so clearly that no description is required.—Drugg. Circ., June, 1901, 117.

FIG. 5.



Pharmaceutical Drug-Mill.

FIG. 6.



Dialyser

New Pharmaceutical Drug-Mill — Construction with Mill-Stones. — August Zemsch, of Wiesbaden, manufactures a small pharmaceutical drug-mill on the lines of the ordinary flour-mill, the grinding surfaces being constructed of the so-called French champagne stone. One of the mill-stones is fixed, the other revolving and capable of being adjusted to grind powders of different degrees of fineness from all kinds of drugs, chemicals, spices, etc., the grinding surfaces being unaffected by, and, in their turn, not affecting the most sensitive chemical or other material. The apparatus, as shown by Fig. 5, is provided with a hopper, which by a suitable mechanical attachment, shakes the previously-granulated material into the mill.—Apoth. Ztg., Nov. 7, 1900, 777.

Dialyser — Construction for Bacteriological Work.—Proskauer has devised a dialyser for bacteriological work which may be found serviceable

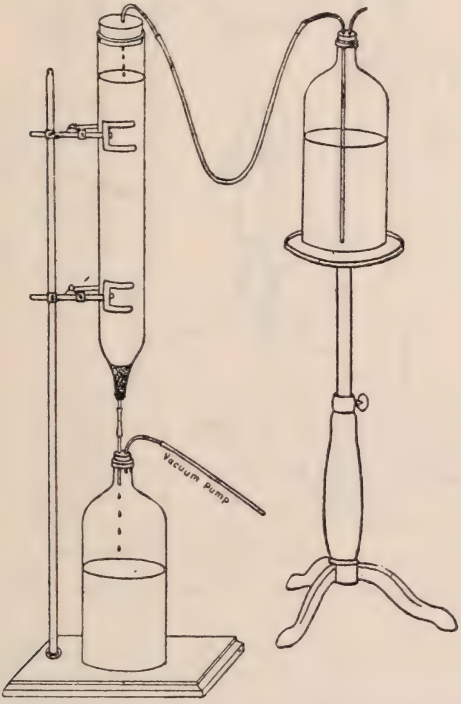
and convenient for a variety of pharmaceutical operations requiring dialyzation. It is shown by Fig. 6 to consist of a glass vessel, *A*, into which the vessel *B* is fitted, being ground in like an ordinary glass stopper. To the lower, open end of *B*, the dialyzing membrane is fastened by means of a string so as to form a bag, the upper end being closed by a stopper. Water is introduced through one of the tubes on the side of *A* and escapes through the other tube on the opposite side, the direction being pointed out by arrows. Under this arrangement, the flow of water through the dialyser may be made continuous by connecting it directly with the water-supply pipe. The apparatus, furthermore, permits operations that require sterilization.—Pharm. Centralh., Oct. 18, 1900, 643.

Filtration—Advantages of Cotton and Sponge as a Clarifying Medium.—W. A. Dawson calls attention to the advantages of cotton and sponge for the filtration of numerous substances daily prepared or dispensed in pharmacies, such as saline solutions, syrups, and the like. The use of cotton requires judgment and a certain knack, which can only be gained by experience. Only the finest quality of long staple cotton should be used. For watery or hydroalcoholic liquids the cotton should be placed as loosely as possible in the neck of the funnel—just firm enough so that it will run through when the liquid is poured on it. With light alcoholic or ethereal liquids it may be packed more firmly. For syrups, sponge is the proper fitting medium. The author prefers the small bleached reef sponge, which should be conical in shape, thoroughly cleaned and washed, and then inserted into the neck of the funnel or percolator so that about one-fourth of its length—the butt or larger end—sticks up into the body of the funnel or percolator. If during this operation it should become twisted, as it usually will, it should be untwisted and straightened from below, so that there may be no impediment to the regularity of the flow of liquid downward. The author gives numerous examples of the application of both methods.—Amer. Drugg., Aug. 27, 1900, 99.

Filtration and Percolation Under Pressure—Simple Apparatus.—Referring to his previous description of an apparatus for column filtration constructed so as to avoid loss by evaporation (see Proceedings, 1900, 399), Jos. F. Hostelley describes two forms of apparatus, constructed on similar lines, for column filtration under pressure, which is equally adapted to percolation. In the first of these (Fig. 7), pressure is produced by suction from a vacuum pump operated in the well-known way — the liquid to be filtered, or the menstruum for the percolation being supplied by the aid of a syphon from a suitably elevated reservoir, and capable of being raised or lowered. The several parts of the apparatus are clearly shown in the excellent cut, and need no further description. The second form of apparatus, shown by Fig. 8, the vacuum pump is combined with the apparatus itself, and consists of an inverted one-gallon bottle of water, which, as the contents flow from it, aspirates at the expense of the air in the re

ceiving bottle. In this we have *F*, the filter, *R*, the receiver, *T*, the tank-bottle for feeding, and *A*, the aspirator, *W*, the waste-bottle. The delivery tube from the filter to receiver is arranged as previously described. The tubing is part rubber and part glass: a short bent tube of glass protrudes from one of the apertures in the twice-punctured stopper of the receiving bottle, to which a section of rubber tubing is joined, which in

FIG. 7.



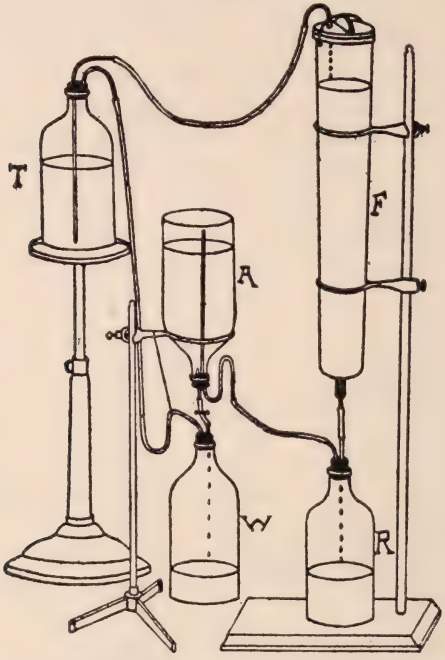
Filtration and Percolation – Pressure by Suction from Vacuum Pump

turn connects with the twice-bent glass tube entering the aspirator bottle, and reaching almost to its bottom. The double turn in the latter tube, outside the bottle, is made to catch any liquid that might otherwise creep into the filtrate receiver. A screw pinch-cock to control the flow of water from the aspirator is placed on the short section of rubber tubing which joins the two pieces of glass tubing protruding from either bottle. The glass tube leaving the tank bottle, should be bent over into an arm that reaches downward for some few inches, to prevent a constriction in the pipe at this point. The rubber tubing may be drawn upward to a nearly vertical degree, as seen in the drawing, to prevent a constriction.

In undertaking the working or use of either of the apparatus shown, it is obviously necessary that all the connections shall be secure and air-

tight. Good corks must be used, but rubber stoppers are better. For particulars of manipulation the original paper must be consulted in Drugg. Circ., July, 1900, 134.

Fig. 8

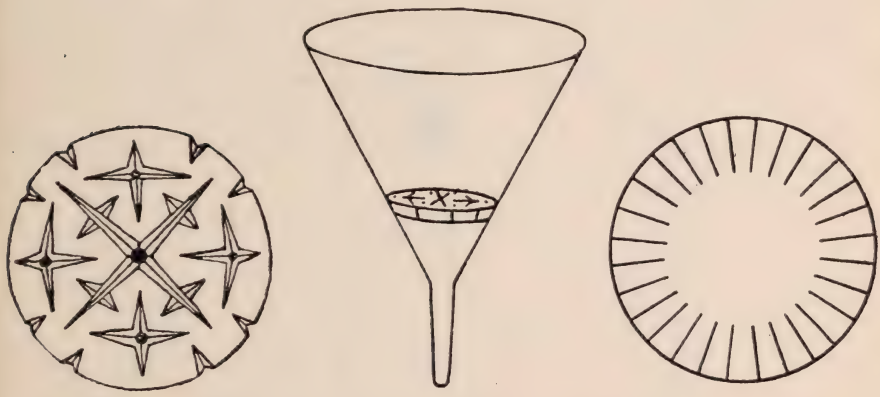


Filtration and Percolation—Vacuum Pump Combined With Apparatus.

Filtration of Dense Fluids—Methods of Hastening Without Pressure.—J. F. Hostelley describes several methods and devices employed by him for hastening the filtration of dense fluids, such as syrup, among which the following may be noted here. For the filtration of heavy syrups he increases the diameter of the filter apex by means of a perforated diaphragm of cork with serrated edges, the cork being cut to lay near the apex of the funnel, the edges of the former coinciding exactly with the angularity of the funnel's sides. When utilizing a one gallon funnel, the filtering septum or "speeder" is usually about four inches in diameter. The upper base of one of these "speeders" is shown by Fig. 9, while Fig. 10 indicates the position it takes in the funnel. The grooves in the upper surface of the "speeder" appreciably accelerate action, and are not found in the porcelain diaphragm usually supplied for this and similar, purpose. The serrations in the edges of the cork (wood may be used if cork of required size is not accessible) likewise augment the efficiency of the device. When it is to be used as an adjunct to filter paper, the latter

is folded to conform at the apex with the surface of the speeder. By this is meant that the point or nose of the filter, which is always left free from creases, is in this instance made much more liberal than usual, so that the uncreased center of filter will be about of the diameter of the cork septum. If the filtering medium is to be sand, Fuller's earth or some such material

FIG. 9. FIG. 10. FIG. 11.

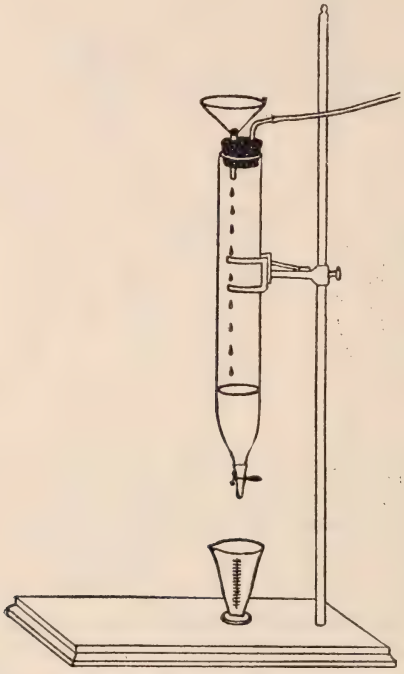


without the paper medium, a piece of felt or cricket cloth—preferably the latter—cut about 1½ inches larger in diameter than the diaphragm, and scored at the edges, as shown by Fig. 11, is laid over the top of the speeder when the latter is in potition. The scallops in the edges are of such a depth that the circle formed within is just the size of the perforated cork, so that when the cloth is in position the scallops can be made to cling to the funnel, affording a perfect foundation for the filter bed. The other methods and modifications described by the author may be consulted in Drugg. Cir., Dec., 1900, 244.

Quick Filtration of Prescriptions—Simple Apparatus.—Mr. Hostelley, in a second paper, describes the simple device for rapid filtration, applicable to prescription work, shown by Fig. 12. It is seen to consist of a small glass percolator supported on a retort stand by means of a clamp, of special device for such purposes. The percolator is provided at the neck with a rubber-tube closed with a pinch-cock, and at the upper mouth with a cork—or, better, rubber stopper—bi-perforated, the one for the reception of a small funnel and the other for a short bent tube over which a rubber extension tube is slipped for connection with an aspirator. The latter may be an ordinary vacuum pump, or it may be a large bottle filled with water and provided with a lateral tube near the bottom to which a hose is attached for the withdrawal of water. By providing two such bottles, the water can be collected in the one or the other, according to its position, each acting as aspirator when elevated, or as collecting bottle when lowered—the change of the one to the other being effected by

temporarily closing the connecting tube leading from the percolator. This arrangement is shown in a second cut, not reproduced here, illustrating a battery of quick-filtering apparatus constructed like the one described above. The author, in a third paper, also illustrates and describes

FIG. 12.



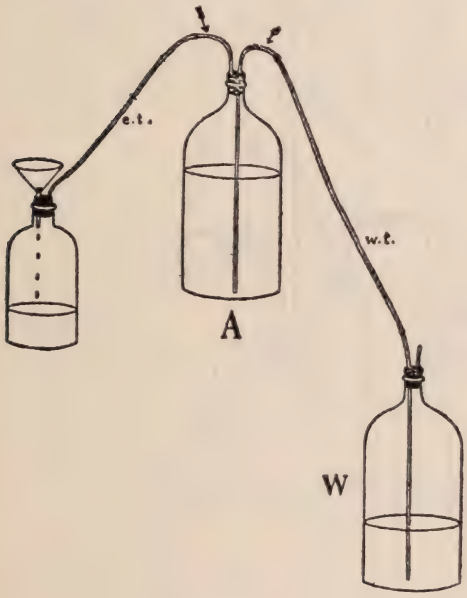
Rapid Filter.

A Quick Filtering Apparatus for the filtration of liquids on a large scale, in which the same principle is maintained. In both papers profuse descriptions of the method and the details of the construction of the several apparatus is given, which may be consulted in Drugg. Circ., Aug. and Sept., 1900, 154 and 174.

Filter-Pump—A Home-Made Contrivance.—In further illustration of his practical suggestions on rapid filtration, noticed in the preceding, Mr. Hosteiley's drawings and description of the home-made aspirator and filter-pump may find place here. The aspirator is shown by Fig. 13, and requires very little explanation. It consists of a common one-gallon bottle, *A*, provided with a suction tube leading to the vessel to be exhausted, and a syphon tube leading into a similarly provided bottle, *W*, which serves for the waste water until full, when it is reversed, taking the place of the aspirator, *A*, and the latter the place of the waste bottle. The aspirator should be at an elevation of three or four feet, or more, above

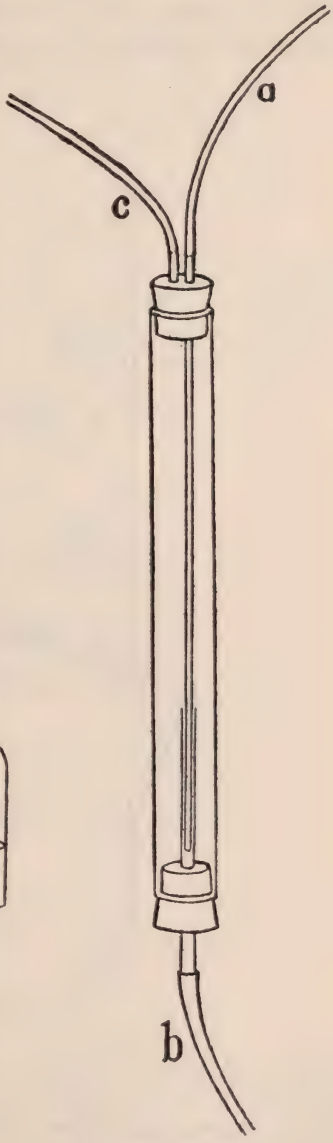
the waste bottle—the higher its elevation the more decided its action. Rubber stoppers, glass and rubber tubing alone are used to effect the connections. The home-made filter-pump, shown by Fig. 14, operates on the same principle as the air-pump of Müncke, Fischer and others, and requires little explanation, if any. The tube *a* is connected with the water supply; it enters the tube *b*, extending a short distance upward from the lower extremity; and in its outward flow exhausts the air from a vessel that may be attached to the tube *c*. The various parts are glass and rubber and easily provided from material usually found in pharmaceutical laboratories.—Drugg. Circ., Oct., 1900, 198.

FIG. 13.



Aspirator.

FIG. 14.

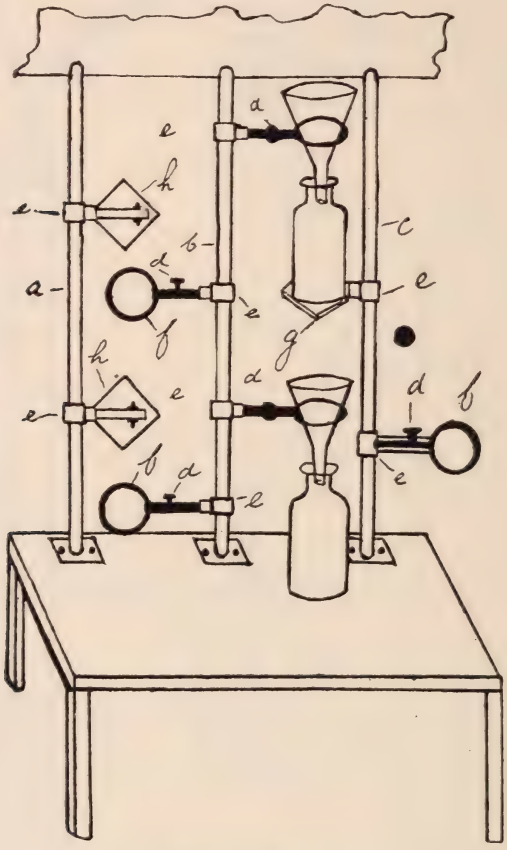


Filter-Pump.

Filtering Rack—Practical Construction.—Edward T. Higby has constructed and describes the filtering rack shown by Fig. 15, the material used being such as is readily supplied by plumbers. The dimensions and

number of uprights may, of course, vary according to requirement and location. These uprights, *a*, reach from the table to the ceiling; they are ordinary gas pipe, screwed into the table as shown, and held in position by holes in the ceiling—or in a shelf immediately above the table. Each upright is provided with a number of T-joints, *e*, conveniently slipping over it, and held in position by means of six inch sections of gas pipe threaded

FIG. 15.

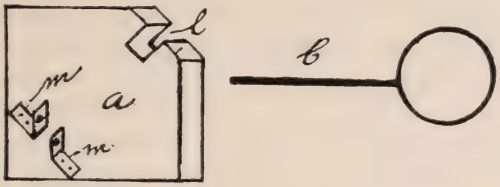


Filtering Rack.

an inch and a half at one end. These sections are provided with thumb screws, *d*, by means of which funnel rings, *f*, made of wire and of varying dimensions are held in place—the thickness of the wire being such that it fits easily but snugly into the sections of the gas pipe. For the reception of the bottles for the filtrate, movable shelves, *h*, are provided and attached to one of the sections of pipe as shown in the drawing. The details are shown by Fig. 16, the under side of the shelf, *a*, being presented.

This is eight inches square and made by nailing together two ½ inch boards across the grain. The slit, *l*, in the corner fits to the upright, while the small brackets, *m*, *m*, hold the shelf on the rod, and prevent it

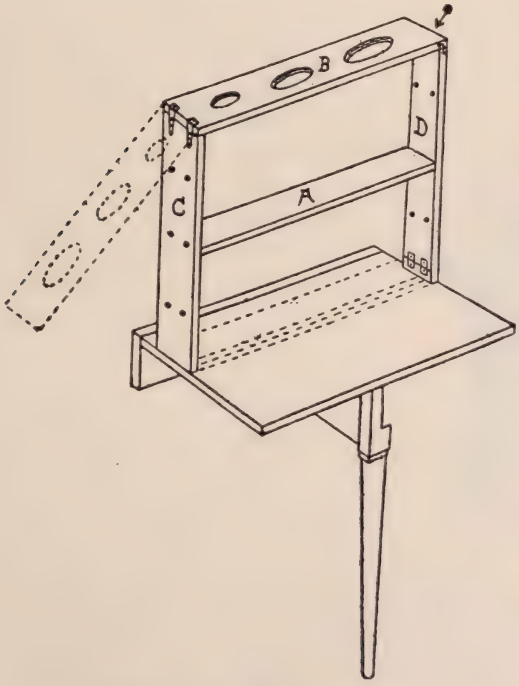
FIG. 16.



Under Side of Shelf.

from tipping. The simple construction of the funnel rings is shown by *b*. As situated in the author's laboratory the uprights are within one inch of the wall, therefore, when not in use, the funnel rings are released by a turn of the thumb screws and turned so as to lie flat against the wall, and thus out of the way.—Merck's Rep., April, 1901, 111.

FIG. 17.

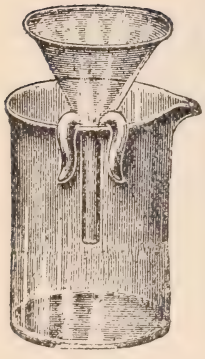


Folding Filter Rack and Table.

Folding Filter Rack and Table—A Convenient Contrivance.—Jos. F.

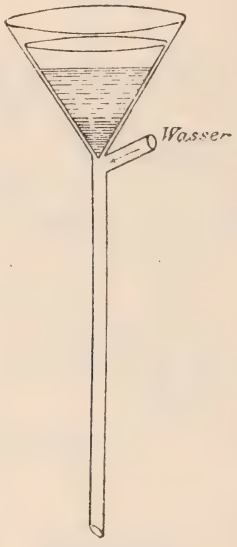
Hostelley has contrived the folding filter rack and table shown by Fig. 17, which may be useful in pharmacies in which space has to be economized. It should be constructed of hard wood throughout, with wire nails, brass hinges and hard oil finish. The details for a table top of 36 inches are given as follows: Board marked *A*, 34½ in.; *B*, 36 in.; *C*, 34 in.; *D*, 32½ in.; thickness of boards, ¾ in.; width of boards, at discretion. The shelf *A* is adjustable to different heights by means of wooden pins passing through two holes bored into the uprights, as shown. The board *B* is hinged to the upright *C*, so that the former may be doubled over to lie flat against the latter, and *C*, in turn, is hinged so as to lie flat on the table, while *D*, provided with countersunk hinges, folds over and lies on top of the other two—the three boards then making an elevation of but 2½ inches. When the rack is adjusted for use, the top *B* is fastened to the upright *D*, at the point shown by the arrow, by some convenient style of catch. When not in use, the shelf *A* may hang on a hook against the wall, and out of the way. Merck's Rep., July, 1900, 312.

FIG. 18.



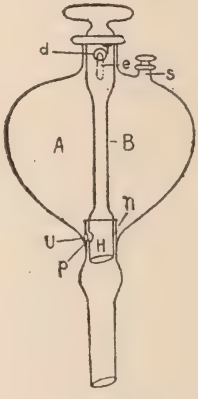
Laboratory Funnel.

FIG. 19.



Vacuum Funnel.

FIG. 20.



Separatory Funnel.

Laboratory Funnel—Convenient Attachment.—The funnel shown by Fig. 18 is described in "Chem.-Ztg" (xxv, 351) as a useful and convenient contrivance to facilitate laboratory work, by rendering the use of filter stands unnecessary in certain operations. The two projecting hooks attached to the base of the funnel-cone, enable it to be suspended from the edge of the beaker or other similar vessel.—Merck's Rep., June, 1901, 180.

Vacuum Funnel—Simple Construction.—Szamatolski has devised the simple form of funnel shown by Fig. 19, which greatly facilitates the separation of liquids from precipitates and avoids the necessity of a vacuum pump for this purpose. It is easily constructed from an ordinary glass funnel, necessary conditions being that the shape of the cone is an angle of 60° and that it is provided with a long neck. At a point immediately beneath the cone of the funnel a slanting side-tube is then attached by well-known methods, through which water is caused to flow by means of a rubber attachment to the water main during the process of filtration. An ordinary plain double filter is the only other requisite. In its downward flow, a partial vacuum is produced in the funnel tube, and the precipitate in the filter is then rapidly drained.—Pharm. Ztg., Feb. 27, 1901, 175.

Separatory Funnel—A New Form for Highly Volatile Liquids.—Dr. T. N. Raikow has devised an improved form of separatory funnel, designed to avoid the drawbacks incident to the ordinary form when very volatile liquids are employed for some time and continuously. As shown in the drawing, Fig. 20, it consists of a glass bulb, *A*, not unlike these now in use, provided, however, with an inward projection, *n*, in which the lower end, *H*, of a glass bulb, *B*, closely fits and acts as a stopper—the upper end also serving to closely stopper the upper opening of *A*. The projection, *n*, is provided with a small opening, *U*, which may be brought opposite a similar opening, *P*, in *H*, by simply turning *B*. The neck of the bottle, *A*, also has an opening, *d*, which may be made to coincide with a small furrow, *e*, in the glass tube, *B*, and this opening and furrow are so arranged as to be coincident when the openings *V* and *P* meet. By this arrangement all evaporation is avoided, and a volatile liquid may be kept in the apparatus for a long time without appreciable loss. The liquid is introduced into *A* through the tube *S*.—Merck's Rep., Feb., 1901, 60; from Chem. Ztg., xxiv, 1089.

APPLICATION OF HEAT.

Fahrenheit's Thermometer—Origin of the Scale.—Samuel Wilks has for many years endeavored, and altogether failed, to obtain an authentic account or reason as to the principle on which Fahrenheit constructed his scale, notwithstanding that he has interrogated some of the most distinguished professors on the subject. It having been mentioned to him by a friend that he believed the scale was founded on the temperature of the blood, this was forcibly recalled on reading an anonymous paper in the "Philosophical Transactions" for 1701, in which it is proposed to make a thermometer founded on the temperature of the human body. The anonymous writer of this paper is believed (by Lord Kelvin?) to be no less a man than Sir Isaac Newton; but whether or not, it appears that writer, using linseed oil in a glass tube, gives a table showing the height in this

instrument at which different liquids boiled, saying: "In the first column we have that degree in which water begins to freeze as the lowest degree, and making the external heat of the human body 12 degrees. Now it appears that the heat of boiling water is almost three times greater than the heat of the human body, being 34 degrees." A few years after the publication of this paper Fahrenheit made his thermometer, and followed this anonymous writer (the author says "Newton") by making the temperature of the body his first resting-place, counting upwards and downwards from this fixed point, although it is not certain that he knew of the essay previously quoted. He found he could get a greater cold than the freezing point of water by mixing together ice and salt, and therefore made this point his zero. He thought also that it would be better if he enlarged the scale by doubling the numbers, and making that of the body 24 instead of 12, starting, of course, from his own zero. This made the freezing point 8 and the boiling point 53, which, as his predecessor had said, was three times that of the human body. His scale then stood thus: Zero, that of ice and salt mixed; 8°, the freezing point of water; 24°, the temperature of the human body, and 53°, the boiling point of water. He then further extended the scale by dividing each degree into four parts, so if it is multiplied by four we have the scale now in use, 32° for freezing, 96° for the body, and 212° for boiling. This information concerting Fahrenheit's experiments and scale is gained by Mr. Wilks from the "Encyclopedia Britanica," and he is of the opinion that the writer of the article in this work must have obtained it from authentic sources.—Pharm. Journ., Oct. 27, 1900, 470–471.

High Temperatures—Cheap and Effective Production.—Dr. H. Goldschmidt produces high temperatures, up to 3000° C., cheaply and effectively by a process dependent upon the heat energy developed by the chemical action between aluminum and certain metallic oxides. When experimenting with the object of discovering a mode of controlling the violent reaction obtained by heating aluminum in contact with metallic oxides, he found that it is not necessary to heat the whole mass up to the requisite temperature for ignition, but that it suffices to start ignition at any one time. When combustion is once started, the reaction proceeds steadily, with more or less speed, throughout the whole mass, thus generating within itself the whole of the heat required. In the case of the refractory oxides, the reaction is started by making use of oxides which combine with aluminum at so low a temperature that they can be ignited with an ordinary match; in their combustion those oxides develop so much heat that if a small quantity of them be placed upon a mixture of refractory oxide and aluminum and ignited the reaction is started, and then proceeds automatically. Thus the heat developed by the combustion of a mixture of alumina and iron is sufficient to start the reaction between aluminum and iron oxide; as the reaction proceeds more and more of the same alumin-

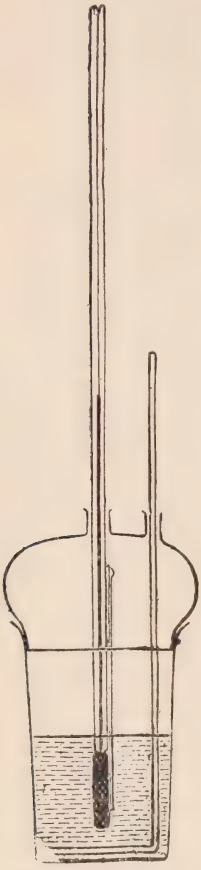
um and iron oxide mixture is added until within a minute or two the crucible contains reduced iron covered by a thick coating of alumina slag. Pyrometer experiments show that the temperature reached in the operation is between 2900° C. and 3000° C., that is to say 1000° C. more than that reached during the hottest period of the Bessemer blow. In the case of the reduction of chrome from its oxide by this method, the temperature of 3000° C. is reached—a temperature hitherto obtainable by the use of the electric arc alone.—Pharm. Journ., Oct. 13, 1900, 413; from Journ. Soc. Arts, *48*, 815.

Melting Points—Determination by Different Methods.—In continuation of their previous investigations concerning the most suitable methods for ascertaining correct "melting points" (see Proceedings, 1900, 407), Thomas Tyrer and Albert Levy contribute a very exhaustive and voluminous study, embracing four methods not considered before by them, and arrive at conclusions based upon the application of all the methods to the determination of the melting points of the following three typical substances: (1) A substance having the character of a fat: *spermaceti*. (2) A substance showing no extraordinary physical peculiarity: *beta-naphthol*. (3) A vegetable body of uncertain constitution, belonging possibly to the glucosides: *picrotoxin*. The five processes previously investigated were those of the B. P. 1898, Graebe's, Landolt's, Piccard's and Loewe's. Those investigated in the present work are Mills' method (Proc. Roy. Soc., xxxiii, 204), Kuhara and Chikashigé's (Chem. News, lxxx, 2089), Vandevyver's (Ann. Chim. Anal. Appl., 1898, 397), and Levy's Acoustical Method, the necessary apparatus for these several methods being described and illustrated by cuts. From the results of their work with the nine methods named, the authors conclude that the most convenient form of apparatus for general work, as applied to a majority of pharmaceutical substances, is Graebe's (Ann. d. Chem. u. d. Pharm., 1887, 238), which is a modification of the apparatus of Anschutz and Schulz (Ber., x, 1877, 1800), whilst electrical methods (Levy's?) which eliminate to some extent the errors of individual observation are to be recommended. The paper is accompanied by tables for the convenient comparison of the results obtained with the three typical substances named, as well as with menthol, thymol, salicylic acid, and carbolic acid; others being devoted to the rapid calculation of the exposed column, correction of the same, melting points given by various pharmacopœias, etc. —Trans. Brit. Pharm. Conf., 1900, 453–467.

Apparatus for Determining Melting-Points—Simple Improvement.—F. W. Streatfeild and J. Davies, in order to avoid certain drawbacks, such as acid fumes, spurting, and dilution of the acid on exposure, when employing the well-known apparatus customarily in use for determining the melting-points of organic compounds above 100° C., have devised the simple improvement shown in the accompanying cut (Fig. 21). It

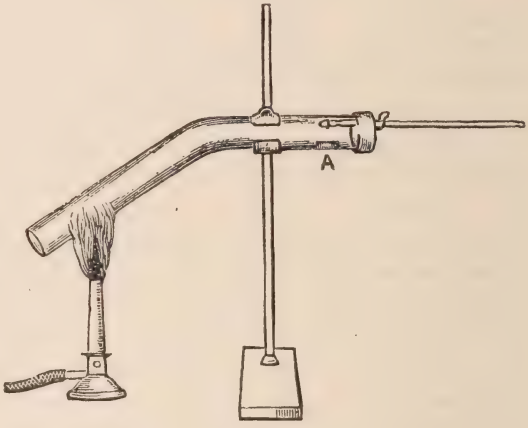
consists of a light dome-shaped glass cover for the beaker containing the sulphuric acid, of such diameter that it rests lightly on the rim. This cover is furnished with two narrow necks, one for the thermometer, which is suspended from a retort stand, and the other for the admission of a glass stirrer. The melting-point tube is attached to the stem of the thermometer, being made to adhere to it by capillarity, induced by moistening the tube and thermometer with sulphuric acid. The cover will be found to form an efficient condenser for the acid fumes, and practically protects the bath from atmospheric moisture.—Chem. News, March 15, 1901, 121.

FIG. 21.



Melting-Points—Simple Arrangement for Drying the Substance to be Tested.—F. W. Streatfeild and F. Southerden describe the simple and inexpensive arrangement, shown by Fig. 22, for removing adherent moisture from organic compounds of which the melting-point is to be determined, which admirably replaces the water- or air-oven usually employed, and rapidly effects complete drying. A piece of combustion tube about 25 cm. in length and 18 mm. internal diameter is bent, as shown, at an angle of 140°. It is clamped with the short arm horizontal, and in this, at *A*, the substance is placed on a small piece of drying paper. By means of a wire loop a thermometer is attached so that the bulb shall be directly over the sample, a piece of fibrous asbestos being wrapped around it to prevent actual contact with the glass tube—the asbestos adhering well if it be first wetted. The hot air is produced by a Bunsen burner, as shown. With a

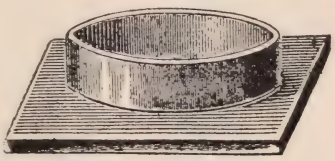
FIG. 22.



tube of the given dimensions, the thermometer will always show 10° or 15° higher than the substance, so that the temperature is practically unlimited up to the melting-point of the substance to be examined, without fear of melting actually occurring.—Chem. News, Aug. 3, 1900, 56.

Asbestos Air Bath—An Efficient Substitute for the Water- or Sand-Bath.—Dr. O. Bottcher recommends the asbestos air-bath shown by Fig. 23 for all operations in which water-baths or sand-baths are commonly used. It consists simply of a sheet of asbestos about 1.5 mm. thick and about 150 x 150 or 180 x 180 mm. square, on which is placed an asbestos ring 30 to 40 mm. thick; but the latter may be in different sizes to fit the flasks or utensils it is intended to heat. If operations are to be carried out at certain temperatures, the latter may be regulated by the aid of a thermometer thrust through a suitable opening in the side of the ring. The source of heat may be a Bunsen burner. The author has used it in all work for which water- or sand-baths are ordinarily employed, with perfect satisfaction.—Merck's Rep., Nov., 1900, 516; from Chem.-Ztg., xxiv, 794.

FIG. 23.



Asbestos Air-Bath.

Hot-Air Closet—Economical Construction for Filtration.—J. F. Hostelley describes the hot-air closet, intended for facilitating the filtration of viscous liquids, such as syrups, etc., shown by Fig. 24. The requisites are a stove with a good draught through the stove-pipe and flue, and a wooden closet of suitable dimensions, according to the space available, provided with glass doors, shelves, etc., as shown in the drawing, or as may be required—these details readily suggesting themselves. By means of a damper, the handle of which is shown, the heated gases from the fire are caused to circulate through two horizontal pipes traversing the interior of the closet. Asbestos collars surround the pipe at the points of entrance into and exit from the closet.—Merck's Rep., July, 1900, 311–312.

Drying Oven—Construction for Electrical Heating.—Warmbrunn, Quilitz & Co. supply the drying oven shown by Fig. 25, heated by electricity, which may be constructed either of iron, copper, or aluminum, according to the demand, and may be either single or double walled. Its inner dimensions are 15 Cm. in height, 20 Cm. in width, and 17 Cm. in depth, when double walled. The hot air is caused to circulate through the double walls into the interior, the current being regulated by means of slides. The heating is effected from outside from beneath by means of a specially constructed electric heater, which is supplied, and the temperature may be regulated so that any desired degree is easily attained and maintained.—Apoth. Ztg., Nov. 3, 1900, 770.

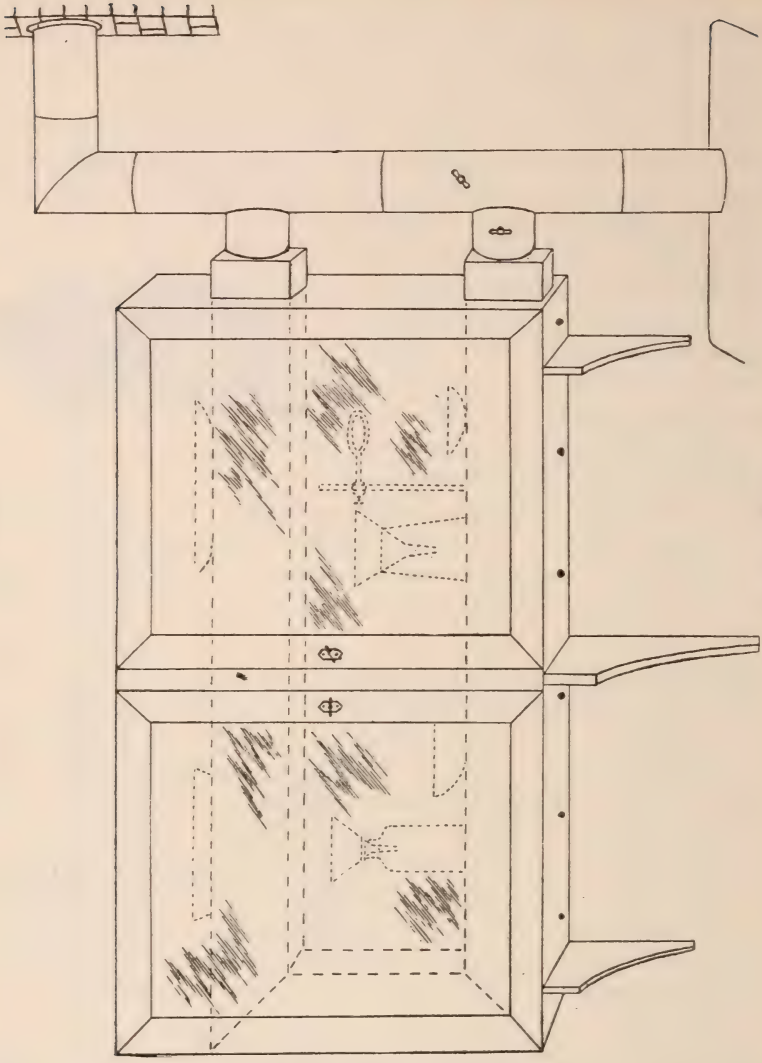
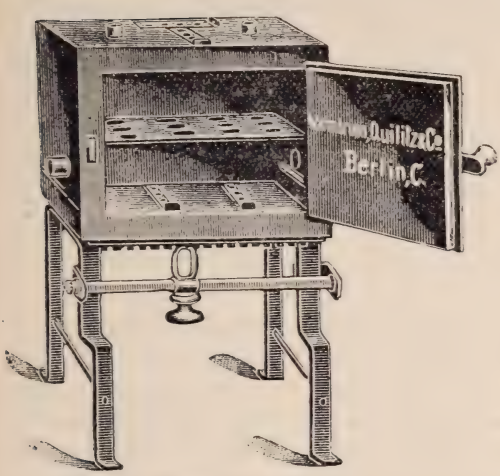


FIG. 24.

Hot-Air Closet.

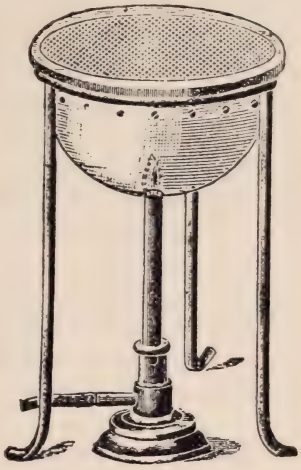
Heat Conserver—A Useful Device.—Hugo Zollna has devised the simple apparatus shown by Fig. 26, whereby a considerable waste of heat is avoided in ordinary operations with a Bunsen burner. It consists of a sheet of asbestos pressed into a semi-spherical form and provided with a wire gauze net, the whole being supported on a tripod. The burner is introduced through a small hole beneath, a number of small holes near the upper rim serve for the escape of combustion products. There is a saving of 25 to 30 per cent. of gas, while the surface of the table beneath is heated but a few degrees above the normal.—Merck's Rep., March, 1901, 89; from Ch. Ztg. xxv, 69.

FIG. 25.



Drying Oven.

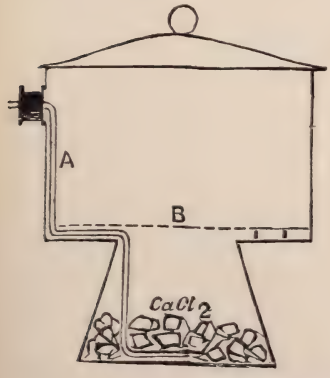
FIG. 26.



Heat Conserver.

Desiccator for Crucible Contents — Improved Construction.—Edwin Dowzard has devised a simple improvement to the desiccators employed for cooling crucibles, which automatically prevents the jumping and side-slip after placing the hot crucible into it, due to the expansion of the contained air, and also avoids the subsequent slight vacuum when the crucible has cooled, causing a sudden inrush of air when the lid is removed. In some desiccators these faults are overcome by means of a tap, which must be opened and shut as occasion requires. In the improvement of the author, shown by Fig. 27, the faults are remedied in a very simple manner. The glass tube, *A*, is bent to fit inside the desiccator; the perforated plate, *B*, is raised sufficiently to allow the tube to pass underneath. This tube allows the air to escape and also to enter; but the air entering must pass through the $CaCl_2$ contained in the lower part of the desiccator, thus insuring its complete dryness. —Ch. News, Oct. 19, 1900, 185.

FIG. 27.



Desiccator for Crucible Contents.

FIG. 28.

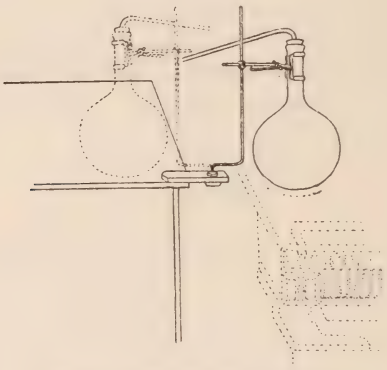
Asbestos Support for Heating Capsules.

Asbestos Support for Heating Capsules—A Simple Device.—Joseph F.

Hostelley describes the support for capsules, shown by Fig. 28, intended for small evaporating or desiccating operations, which is constructed as follows: From a section of asbestos board possibly ½ inch thick, cut a circular disk of almost any desired dimensions, in which two, three or more round apertures are made with a sharp knife. These holes are to vary in size, each to be not quite as large as the top of a certain small porcelain or glass evaporating dish. From narrow strips of brass, sheet iron or tin, three low legs are made for this disk and affixed to the rim, equidistant apart, by bending around the edge and letting one end project an inch or more beyond one face of the disk, which becomes the bottom of the device. It will be necessary to rivet the legs to the asbestos that they may not forsake their position. When a small operation of evaporation or desiccation is to be conducted, the substance to be treated is put into an evaporating dish of little capacity, the vessel is set into one of the apertures in the asbestos disk of appropriate size and the contrivance rested on the top of the laboratory or kitchen range, with a light cover over the vessel or vessels to prevent the entrance of dust.—Amer. Drugg., Nov. 12, 1900, 275.

Support for Heating Flasks, etc.—A Handy Laboratory Device.—In the accompanying illustration, Joseph F. Hostelley pictures a very useful ad-

Fig. 29.



Support for Heating Flasks.

junct to the laboratory range. The device consists of a long slender rod of iron, shaped as shown by Fig. 29, secured in a horizontal position to a table or bench close to the range. The rod fits loosely into the socket of its support, so that it is free to turn. This standard affords an admirable support for retorts to be held over the range during distillation, one of the large iron clamps peculiar to the laboratory being adjusted thereon to clasp the neck of the flask. With the standard in this position a flask can be held at any desired distance above the heat of the range by a mere adjustment of the clamp. When it is desired that the vessel be removed from

the heat to a cooler locality, the standard is swung round, as pictured by dotted lines, where it may rest until the contents of the vessel have sufficiently cooled to allow of their transfer to another container. Anything that may require heating in an evaporating dish may be accommodated by adjusting to the standard an iron ring such as used on a retort stand, clamping the ring at the desired height above the heat and setting the dish thereon. Several dishes may be heated at one time in this way, varying degrees of heat being felt by the several vessels. The standard can be made a portable device that may be put out of the way when not in service.—Amer. Drugg., Sept. 24, 1900, 159.

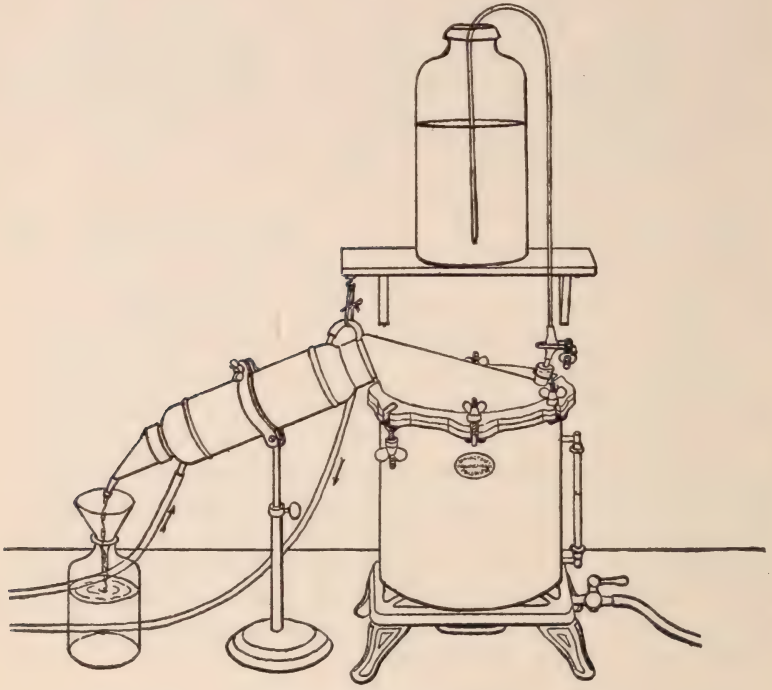
Distillation and Distilling Apparatus—History.—Oswald Schreiner communicates a very interesting and comprehensive series of papers on the history of the art of distillation and of distilling apparatus, adapted and supplemented from "The Volatile Oils" of Gildemeister and Hoffmann, which very lucidly reveals the long and varied course which had to be followed in the pursuit of this art, and in the construction of the apparatus necessary in order to bring them to their present technical and scientific perfection—from the primitive *cucurbita*, the *alembic* and the *berchile*, to the steam and vacuum apparatus and rectifying columns of our own times. The author considers his subject under two headings: (1) History of distillation up to the eighteenth century, and (2) History of the distillation of volatile oils during the eighteenth and nineteenth centuries, the series of installments, which are profusely illustrated, running through each monthly number of the "Pharmaceutical Review" from October, 1900, to May, 1901, inclusive.

Remington Still—Minor Improvements.—J. Percy Remington has devised some minor improvements in the still invented by Prof. Joseph Remington. The first improvement consists in replacing the clamps heretofore used for tightening the still top to the body by thumb-screws which are *hinged* to the body, thus facilitating the adjustment and removal of the still-head; the second, in encircling the heavy condenser with a clamp, capable of secure adjustment at any point. These improvements are shown in the accompanying cut (Fig. 30).—Amer. Journ. Pharm., Feb., 1901, 81–83.

Condenser for Distillation of Solidifiable Substances—Simple Construction.—F. W. Streatfield and F. Southerden describe a useful attachment to the condenser of the apparatus intended for the distillation of substances which tend to solidify in the condenser, which is shown by Fig. 31. It consists of a glass tube running the whole length of the inside, and through the condenser, the short outer end bent upward. This is connected to the steam generator by a rubber tube, which is provided with a pinch-cock. When a block is threatened by solidification of the distillate, the pinch-cock is opened, and the heat from the steam rapidly removes

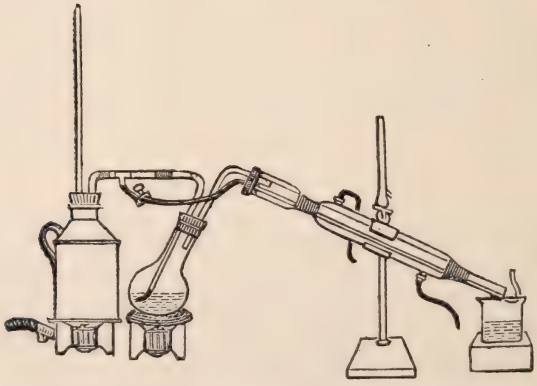
any obstruction. The advantages are obvious, and, with the use of a condensing-tube having a wide mouth, the construction is simple.—Chem. News, Aug. 3, 1900, 56.

FIG. 30.



Improved Remington Still.

FIG. 31.

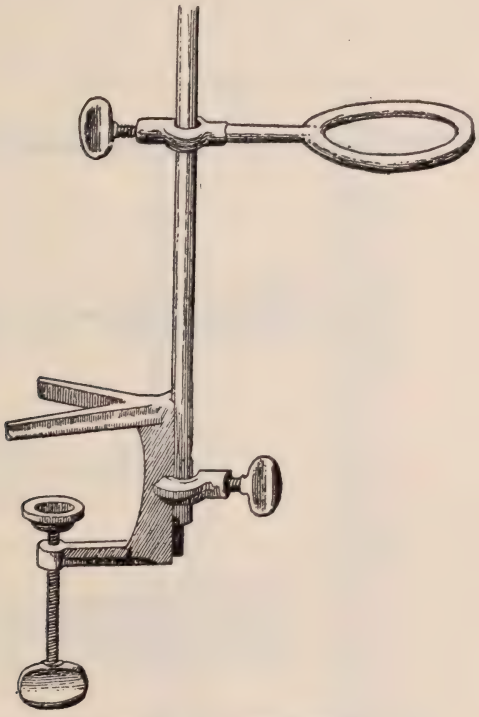


Condenser for Distillation of Solidifiable Substances.

Retort Stand — Improved Device. — L. E. Sayre has devised the retort

stand shown by Fig. 32, which possesses the advantage of occupying very little space on the operating table, and may be changed from place to place as desired. It is essentially an improvement of the clamp-retort stand described by the author in 1888 (see Proceedings 1888, 227). In

FIG. 32.



Retort Stand—Improved Device.

the present modification the clamp is forked at the top, which makes it light, and, at the same time, when fastened by the thumb-screw, it is very rigid. The thumb-screw is provided with an extra large cap, which gives it a firm grip, and prevents the marring of the shelf to which it may be fastened. All of the essential parts are clearly shown in the drawing.—Drugg. Circ., Jan., 1901, 6.

MISCELLANEOUS APPARATUS AND OPERATIONS.

Pharmacists' Apparatus Stand — A Practical Device. — J. Percy Remington describes a pharmacists' apparatus stand, shown by Fig. 33, which he has devised with the view to supplying in a compact and convenient form the support for the various apparatus used in the daily work of the store and laboratory. It is constructed of two upright tubes of heavy iron, secured firmly at the bottom by counter plates. Two parallel, horizontal,

double tubes are arranged, so as to slide up and down these uprights, and secured by means of thumb-screws at any desired elevation. The ring clamps, instead of being all in one piece, as in the ordinary stands, are made in two parts, the clamp comprising one part, and the rings, with

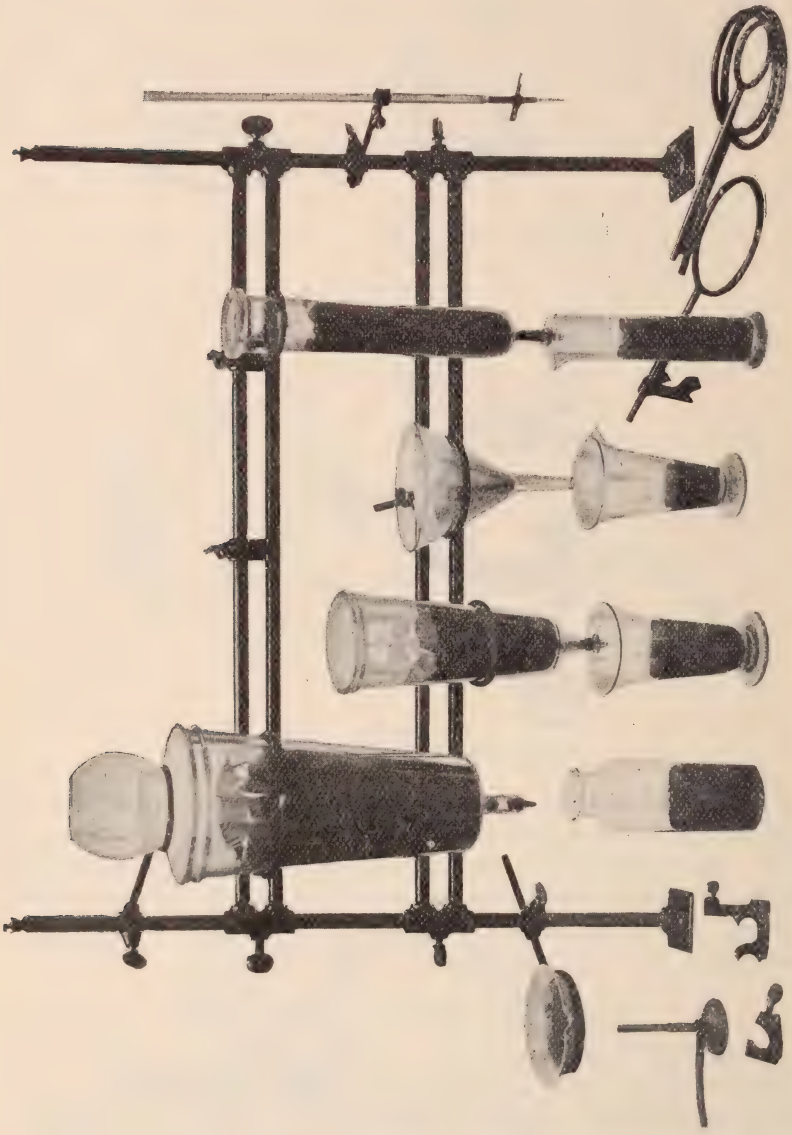


FIG. 33.

Pharmacists' Apparatus Stand — A Practical Device.

12-inch shanks, the other part. The shanks of the rings are passed through two openings in the clamps, and are made secure by thumb-screws. The clamps are of two kinds, those which slide horizontally on

the double tubes, and those which slide vertically on the uprights. The shafts of the ring are all of the same size, so that they are interchangeable to either form of clamp. The rings vary in diameter from 3 to 7 inches. The thumb-screws are of brass, the castings all of malleable iron, and the frame-work being of heavy iron tubing, every element of solidity is secured for all parts of the apparatus, the general utility of which becomes evident by an inspection of the drawing. The space which it occupies when not in use, and the rings removed, is very small, the frame standing on the counter 4 inches from the wall, thus taking up the room which is least valuable, and leaving all the front available for other purposes, although, of course, its exact location must vary in different stores. — Amer. Jour. Pharm., Jan., 1901, 19–21.

Glass Containers—Effect of Different Colors on Their Medicinal Contents. — H. P. Madsen calls attention to the fact that while modernly orange-colored glass containers are considered the best protectors of drugs and chemicals which are known to be sensitive to the influence of white light, the use of ruby-red glass, commonly employed in photography for this purpose, appears to be unknown in pharmacy. He has been engaged since 1897 in an investigation of the influence of different colored light upon medicaments, exposing them, under otherwise identical conditions, in containers of colorless, orange, ruby-red and (latterly also) green glass to the direct action of sunlight. The results of these investigations, covering medicated waters, solutions, powdered vegetable drugs, volatile oils and chemical compounds of various sorts, are recorded in a series of tables, and while not conclusive, seem to point out that the ruby-red and orange glasses are, in the main, the best protectives against the unfavorable influence of light, the one serving a better purpose than the other in certain cases. On the other hand, certain preparations, such as solutions of cocaine, creosote, ferrous solutions, etc., are best preserved in white (colorless) glass. Concerning the use of green glass, the experiments have not been numerous enough to afford certain data; but so far as they have been made, they indicate the utility of green glass in some cases to be equal to that of orange glass. — Apoth. Ztg., July 7 and 11, 1900, 460–462 and 470–472.

Glass Containers—Relative value of different colors to protect contents and method of testing them.—H. J. Möller has also endeavored by a photochemical method to determine the color of glass that is most efficient for protecting medicine against the chemical action of light. He finds (1) that black, red, orange and yellowish-brown glass containers are as a rule the best protectors; (2) that brownish-yellow, dark green (free from bluish tint) and dark brownish-green glass also serves well, but is inferior to the first mentioned; while (3) bluish-green, violet, milky-white, blue and colorless glass are at best only feeble protection against the actinic rays of sunlight, or completely fail to protect. In order to determine the

protective value of glass containers the author recommends the following test: The flask or container is first carefully cleansed with hydrochloric acid, water, alcohol potassium iodide solution and, finally, distilled water, in the order named. Then 50 Cc. of a 2 per cent. aqueous solution of potassium iodide and 2 Cc. of dilute sulphuric acid, containing 10 per cent. H_2SO_4, are added, the flask is well corked, shaken, and exposed to direct sunlight during 2 hours. The iodine set free by this exposure is then titrated with $\frac{N}{10}$ sodium thiosulphate solution, using starch paste as indicator. Flasks of colored glass indicated under (1) will not consume more than 0.04 Cc., while those indicated under (2) will consume at most 0.13 Cc. of the thiosulphate solution.—Apoth. Ztg., Aug. 1, 1900, 522; from Ber. d. d. Pharm. Ges., 1900, 171.

Labeling Containers—Practical Directions. — Frank E. Miller gives the following suggestions regarding the labeling of containers, which will possibly prove welcome to economical pharmacists:

Print the titles and such notes as are necessary on good white paper. The best ink for this purpose is Higgins' waterproof drawing ink. Paste the label on the container with a good adhesive mucilage or paste. A paste prepared according to the following formula has given good satisfaction:

Wheat flour, 4 ounces; boric acid, 20 grains; water, 1 pint; nitric acid, 1 dram. Heat slowly with constant stirring till it thickens.

A good way to leave a border around the label is first to paste a larger piece of colored paper on the container, and then the white label over it. After drying well, apply the following size with a brush:

Acacia, 4 parts; glycerin, 0.5 part; boric acid, 0.1 part; water, enough to make 16 parts.

When dry, varnish with damar varnish, thinned with oil of turpentine.

The glycerin in the sizing prevents the cracking of the coat when dry, and the sizing is necessary to prevent the varnish from soaking through the label. The damar varnish does not turn yellow with age, as do bleached shellac and other varnishes.—West. Drugg., June, 1901, 290.

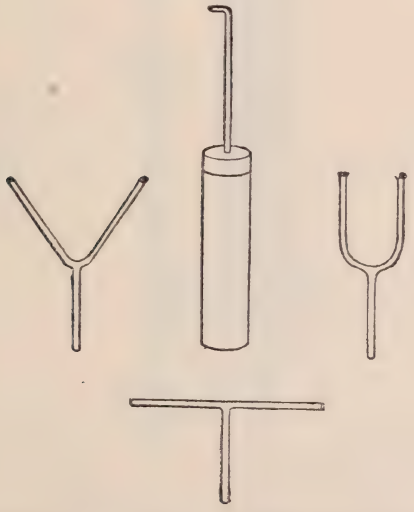
Bottle-Drying—Quick Method.—F. N. Strickland calls attention to the ordinary bicycle-pump as a convenient implement for rapidly drying bottles. After superficial draining, the rubber tube of the pump is inserted into the bottle, when a few strokes will suffice to drive out the moist air completely.—Drugg. Circ., Aug., 1900, 156.

Glass Bottles, Tubes, Etc.—Convenient Method of Obtaining Regular and Smooth Fractures.—F. N. Strickland recommends the following convenient and quick method for cutting off the top of a bottle, the neck of a funnel, or any other glass utensil: Pour into the bottle, tumbler or flask that you wish cut off, enough cotton-seed oil or any other fixed oil, so that it will reach the exact place where the fracture is desired; then heat an

iron rod to red heat and plunge it into the oil, when the temperature is raised so suddenly that the cold glass at the point of contact cannot stand this sudden expansion, and so with a snap, cracks off clean and smooth and better than it could be cut with a file and much quicker. Glass tubes may be cut off in this way by immersing the tube to the desired depth in the oil, and then plunging the hot iron down inside the tube, if it is large enough to admit the rod, otherwise directly into the oil, when the fracture will occur.—Drugg. Circ., Aug., 1900, 155.

Glass Tubes — Implement for, and Method of Shaping. — Joseph F. Hostelley gives practical directions for making "*T*," "*Y*" and "*U*" tubes by the aid of the simple tool shown along with these several kinds of tubes by Fig. 34. This tool is made by driving wire nails of suitable thickness, according to the size of the glass tube to be operated on, into a handle of wood, nipping off the heads, and then bending the ends, as shown in the cut, so as to form a short hook of a size to enter the tube. Instead of the wooden handle, if a longer tool is required, a piece of glass tubing can be welded on to the nail. To form a "T" tube, a short section of glass tubing is taken in hand and carefully heated at a point where the tail of the "T" is to branch out, the flame being directed more on the side to which the tube attachment is to be made than upon the other,

FIG. 34.



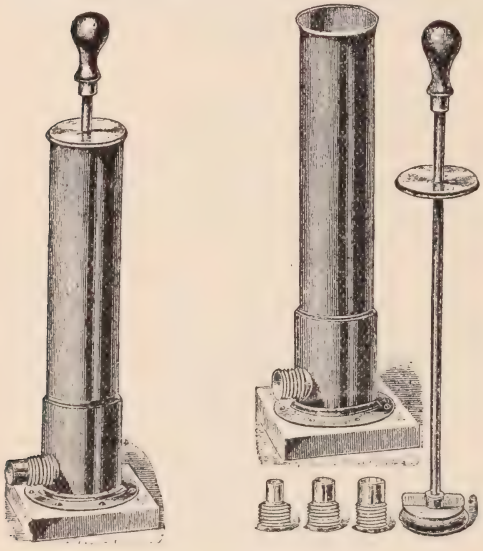
Glass "T," "U" and "Y" Tubes and Tool.

until the temperature of the tube permits of the bunsen flame being steadily directed to one spot; then the tool is inserted in the tube, the prong pressed firmly but not hard against the point where the flame plays, pressing out the wall of the tube into a nodule of glass, which, as

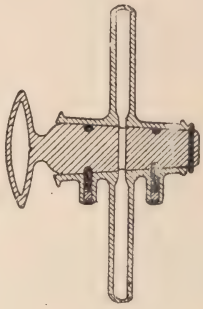
the degree of heat is elevated, is pierced by the point of the prong. Now the size of this perforation is increased by keeping the tube heated, and "combing" out the sides of the aperture with the point of an awl. When the size of the perforation about corresponds with the bore of the tube that is to be joined to the first to complete the "T," the second tube is carefully welded at the proper angle. Tubes with moderately thick walls should be chosen, and the heat should be modified to avoid distortions in the tubes. The "Y" and "U" are made by giving the desired bent to the initial "T" tube.—Drugg. Circ., Feb., 1901, 27.

Apparatus for Filling Tubes—Advantageous Construction.—A. Hoelzle has devised the apparatus for filling tubes shown by Figs. 35 and 36, which possesses the advantage of adaptability to tubes of different sizes, convenience of manipulation, and facility of cleaning after use. It is composed of a metallic cylinder which is provided with a screw-thread beneath by means of which it is screwed to the base of the same metal, which, in turn, is fastened to a wooden block or to a table. The lateral opening near the bottom is provided with interchangable outlet-pieces of

FIG. 35. FIG. 36. FIG. 37.



Apparatus for Filling Tubes.



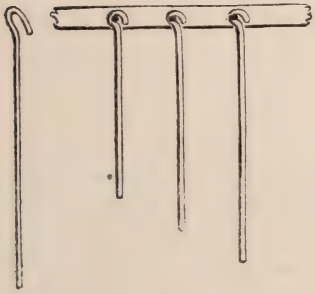
Glass Cock.

different sizes to fit the four sizes of tubes in popular use. The material is forced out means of the piston shown by Fig. 36, the piston being constructed of two circular metallic plates between which a slightly larger rubber disc is interposed to make it fit air-tight into the cylinder and to prevent the friction of metal against metal. The piston rod passes through the cover of metal, which fits snugly over the opening of the cylinder, and steadies the rod.—Pharm. Ztg., July 11, 1900, 533.

Glass Cocks—Provision of Mercury-Seal to Prevent Leakage.—In order to make the glass cocks of apparatus impermeable to gases and to prevent leakage of any sort, H. Guckel provides them with a mercury-seal as shown in the accompanying cut (Fig. 37). Two furrows are ground in the periphery of the stopper, one on each side of the central tube, and these are filled with mercury, after the stopper has been inserted, through holes in the seal bored directly over the furrows and provided with short necks which may be closed with corks and sealed. To prevent the stopper from slipping out, the narrower end protrudes slightly; a hole is drilled through the protruding end, and a pin inserted, which secures it perfectly.—Ph. Ztg., Oct. 13, 1900, 797.

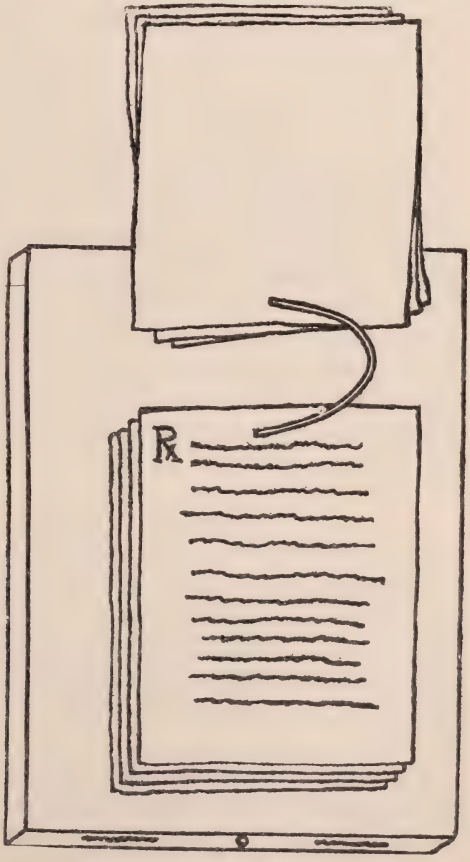
Stirring Rods—Convenient Construction from Glass Tubing.—Edwin Dowzard calls attention to the convenient stirring-rods made from glass tubing sealed at both ends, one end being bent into a hook as shown in the cut (Fig. 38). The hook serves both as a handle when in use, and

FIG. 38.



Stirring Rods.

FIG. 39.



Prescription Files.

FIG. 40.

for hanging up the different sizes on nails for convenient selection.—Chem. News, Oct. 19, 1900, 185.

Prescription File—A Cheap and Practical Device.—Joseph F. Hostelley recommends the prescription file shown by Fig. 39, which possesses the merit of economy with practical utility. It is not intended for immediate use when receiving and compounding a prescription, for which an ordinary table spindle is used in the usual way, but for filing the daily accumulation compactly and in a way for easy reference. The details of the simple construction are shown by Fig. 40. A brass wire is fastened through a gimlet hole, protected by a little square sheet of brass, into a half-inch board, 12x6 in. in size, 3½ inches from the narrower edge and midway between the sides. It is bent to form a semi-circle, and an acute bend is made about ¼ in from the extremity, by means of which it is easily and securely fastened in a small staple by slightly compressing the arch and then releasing the pressure so that the end may enter it. An arch 3 inches high and a 2½ inch span will nicely accommodate three hundred or more prescriptions. The manner of using it is well shown in the cuts.—Merck's Rep., June, 1901, 180.

B. Preparations.

CAPSULÆ.

Creosote Capsules—Misrepresentation of Strength by French Manufacturers.—J. Bongault points out that creosote must be diluted with at least twice its weight in oil when enclosed in capsules, and better if it is diluted with thrice its weight. He has examined a number of samples of French make and gives a method suitable for this purpose. The conclusions drawn from the results obtained are that transparent capsules and perles cannot contain more than one-third their weight of creosote, and that, in France, the manufactured article is seldom so strong as it is represented to be.—Pharm. Journ., Oct. 13, 1900, 414; from Journ. Pharm. Chim. (6), *12*, 267.

CHARTÆ.

Parchment Paper—Use for Weighing Oils and Balsams.—John K. Williams recalls the method of weighing oils and balsams recommended by Mr. Houghton several years ago. It consists in forming a cup for weighing them, by pressing a small square of parchment paper down over a bottle stopper. From such a cup the last trace of the weighed oil or balsam can be scraped with a spatula and utilized.—West. Drugg., July, 1900, 359.

Iodine Paper—Ingenious and Effective Preparation.—L. Trixier suggests an ingenious, convenient and effective form for the topical application of iodine, which depends on the liberation of the latter when potas-

sium iod-iodide and potassium bisulphite are brought into contact with each other in the presence of moisture. Sheets of tissue paper are saturated on the one hand with a solution of potassium iod-iodide, prepared with iodine, 50 Gm.; solution of potassium hydrate (33 per cent.), 80 Gm.; and water, enough to make 500 Gm., and with a solution of potassium bisulphite (1 : 8) in water, on the other, both papers being carefully dried. A sheet of filter paper is then interposed between the two, and fastened together on the edges by a cement composed of resin, turpentine and vaselin oil. In use, this paper, designated by the author as "Topique iodé," is drawn through water, allowed to drain for a second or two, and applied to the part to be treated, when, after covering with gutta-percha paper, it exerts energetically the effects of the liberated iodine.—Pharm. Ztg., Mar. 6, 1901, 196; from Bull. des Sc. Pharm., 1901, No. 2.

Starch Test-Paper—Preparation of a Sensitive Article.—G. Denigès and J. Sabrazès recommend the following method of preparing starch test-paper, which is particularly useful for detecting minute traces of iodides in clinical tests, when some iodine compound has been administered for diagnostic purposes. One Gm. of starch powder is rubbed down in a capsule with 10 Cc. of cold distilled water; to it is then added 40 Cc. of boiling water. The mixture is boiled for two minutes with constant stirring. On cooling, sodium nitrite, 0.5 Gm., is dissolved in the mixture. The paste is then applied with a brush alternately to both sides of a sheet of stout unglazed paper, one side being allowed to dry before painting the other; when quite dry it is cut into strips and preserved in boxes or stoppered bottles. To test for iodides, the paper is first moistened with some of the liquid to be tested, such as saliva, and the moist spot is then touched with a drop of dilute (1 : 10) sulphuric acid. The characteristic color will be given in the presence of 0.001 Mgm. of KI. When testing for very minute traces it is well to moisten a long strip of the paper for about one or two inches, and allow the drop of acid to trickle down; as it runs down it will remove any iodide present, and the color reaction will become evident at the bottom of the paper.—Pharm. Journ., June 29, 1901, 829; from Bull. Soc. Pharm. de Bordeaux, 45, 33.

COLLODION.

Collodion-Varnish—A Protection for the Hands Against Infection.—Jos. Lévai recommends the following collodion preparation as answering all the demands that may be required for protecting the hands against infection in surgery; 2 p. copal and 4 p. Venice turpentine are heated together until a homogenous, glassy mass results. On cooling this is dissolved in 100 p. ether and, after solution, 100 p. collodion are added. The opaque fluid so obtained becomes perfectly clear on addition of 8 parts of acetone.—Apoth. Ztg., Aug. 25, 1900, 583; from Gyógyászat, 1900, 24/6, through Klin. ther. Wchschr., 1900, 1035.

ELIXIRES.

Elixir of Heroin and Terpin Hydrate—Formula.—T. B. McClintock communicates the following formula for an "Elixir of Heroin and Terpin Hydrate," and recommends it as yielding a satisfactory preparation: Dissolve 192 grains of powdered terpin hydrate in 11 fluid ounces of glycerin by the careful application of heat, and allow to cool. Then dissolve 5½ grains of heroin in 2 fluid ounces of alcohol, add to this solution 10 minims of spirit of bitter almond (5 per cent.) and 15 minims of compound spirit of orange. Mix the two solutions, then add 2 fluid ounces of syrup of wild cherry and sufficient alcohol to make 1 pint of finished product.—Amer. Jour. Pharm., Jan., 1901, 31.

Elixir of Pepsin—Improved Formula.—Jno. H. Haydon, Jr., recommends the following formula for an elixir of pepsin which fulfils all the requirements as a digestive agent, and at the same time possesses the character of a concentrated rennet:

Granular pepsin, U. S. P.	512 grains.
Granular rennet (concent.)	512 grains.
Distilled water	8 fl. ozs.
Glycerin	4 fl. ozs.
Deodorized alcohol	8 fl. ozs.
Detannated muscatel wine (domestic), sufficient to make	4 pints.

Mix the water and glycerin, add the pepsin and rennet, and allow them to stand for three or four hours, until they are apparently dissolved. Then add the deodorized alcohol and sufficient wine to make four pints. Mix with one ounce of talcum, and allow to stand a week and filter. After the finished preparation is filtered, it should be tested by adding a fluid drachm to two pints of fresh milk, previously warmed to 100 degrees F., and stirring only sufficient to mix them. In fifteen minutes or so a firm curd should be formed. If it fails the rennet is at fault and is not strong enough for the purpose. If a good grade of pepsin is used, one teaspoonful of this elixir will digest 3,000 grains of coagulated egg albumen.—Amer. Drugg., Nov. 26, 1900, 307.

Elixir of Pyrophosphate of Iron, Quinine and Strychnine—Modification of Formula.—John K. Williams attributes the darkening of elixir of pyrophosphate of iron, quinine and strychnine to the quality of the pyrophosphate of iron used, and has found the remedy in using that made by Squibb, which invariably gives a permanently green preparation when the following formula and manipulation is followed: Triturate 4 drachms of quinine sulphate, 4 grains of strychnine sulphate, and 20 grains of milk sugar together, add 2 ozs. of glycerin (C. P.) and then 8 ozs. of deodorized alcohol, and 32 ozs. of simple elixir (colorless), heating one-fourth of the elixir slightly and adding first so as to dissolve the quinine. Now add a solution of 2 ozs. of Squibb's iron pyrophosphate and 2 drachms of

potassium citrate in 8 ozs. of boiling water, mix, add 2 ozs. each of "white curaçoa" and "marasquino" and 12 ozs. of simple elixir. Mix, filter and finally add enough simple elixir to make 64 ozs. It should be kept in amber-colored bottles, away from the light.—West. Drugg., July, 1900, 357.

EMPLASTRA.

Viscin Plasters—Preparation. — Reihl and Stich advocate the use of "viscin," a caoutchouc-like body obtained from the white mistletoe (see *Viscum album*, under "Materia Medica") for preparing various plasters. The crude product derived from the berries, leaves and bark of the plant, is purified by washing with soda, and then with water, until neutral, drying and washing with alcohol. It is then dissolved in benzin, forming

Solutio Viscini, a dark-green, syrupy liquid, which forms the basis of the following preparations:

Emplastrum Viscini Simplex: Viscin solution, 1500; powdered orris root, 100; starch, 400; Venice turpentine, 280; powdered damar, 30 parts. This is intended simply as an adhesive plaster. Formulas are given for various

Medicated Viscin Plasters, which are made by omitting the Venice turpentine and powdered damar, and adding certain medicinal ingredients, thus:

Salicylic Viscin Plaster, 5 to 10 per cent. salicylic acid.

Viscin Plaster with Mercury, 10 to 20 per cent. "extinguished" mercury.

Viscin Plaster with Iodoform, 2 to 10 per cent. of iodoform, etc.—Oester. Zeitsch. f. Pharm., *54* (1900), 1036.

EMULSA.

Emulsions—Review of Processes and Agents.—A. E. Hiss interestingly reviews and explains the various processes and agents used for emulsifying oils and resinous substances. The methods reviewed are: the "continental," in which acacia, oil and water are used in definite relation to each other; the "English," in which oil and water are added alternately to the gum under trituration after each addition; and the "flask method," particularly adapted to the whitish oils, in which the oil is first shaken with the gum—either powdered tragacanth, or, better, a mixture of powdered tragacanth and acacia—and then the water added and the whole well shaken in a flask. Emulsifying agents reviewed are: Saccharated casein; condensed milk; egg-yolk; mucilage of Irish moss; extract of malt. Unsatisfactory agents are: the mucilage of flaxseed, of acacia, and of dextrin; gelatin; tincture of soap bark; saponin, etc. Finally the "proprietary emulsifiers" are briefly mentioned. These are directed to be used by shaking half an ounce to one ounce with 8 fluidounces of the oil (and

the necessary amount of water, Rep.) in a bottle, and may be replaced by mixing equal parts of powdered acacia, powdered tragacanth, corn starch, and powdered white sugar.—W. Drug., Aug., 1900, 416–418.

Palatable Emulsions—Formulas.—Prof. J. W. Sturmer recommends the following formulas for preparing various palatable emulsions:

1. *Turpentine Emulsion.* [*Formula for 60 Cc.*]—Oil of turpentine, 10 Cc.; Expressed oil of almond, 10 Cc.; Powdered acacia, 5 Gm.; Powdered tragacanth, .25 Gm.; Solution of saccharin (N. F.), 4 to 5 drops; Infusion of coffee, q. s. 60 Cc. Make the infusion of coffee by percolation (as for soda syrup) and allow it to cool. Mix the oil of turpentine and the expressed oil of almond in a mortar, incorporate the acacia and tragacanth, add 15 Cc. of infusion of coffee (in one portion), and triturate briskly until an emulsion is formed; then add enough infusion of coffee to make 60 Cc. and lastly, enough solution of saccharin to sweeten. The expressed oil of almond not only reduces the acridity of the emulsion, but also renders emulsification less difficult. All the flavoring agents commonly used in emulsion were tried; and coffee was found to answer best for masking the odor and taste of turpentine.

2. *Cod Liver Oil Emulsion.* [*Formula for 60 Cc.*]—Cod liver oil, best 30 Cc.; Oil lemon, 3 to 4 drops; Powd. acacia, 6.5 Gm.; Powd. tragacanth, .25 Gm.; Citric acid, .5 Gm.; Water, q. s., 60 Cc. Mix the cod liver oil and the oil of lemon in a mortar, incorporate the gums, add 15 Cc. of water and emulsify; then incorporate the remainder of the water (14 Cc.) in which the citric acid has previously been dissolved. The flavor and slightly sour taste of this emulsion is quite acceptable to certain persons who relish "salmon with lemon."

3. *Castor Oil Emulsion with Orange.* [*For 60 Cc.*]—Castor oil (good quality), 30 Cc.; Powd. acacia, 6.5 Gm.; Powd. tragacanth, .25 Gm.; Oil curacao orange, 3 to 4 drops; Solution of saccharin (N. F.), 4 to 5 drops; Water, q. s., 60 Cc. Mix oils and gums in a mortar, add 15 Cc. of water and emulsify; then incorporate the solution of saccharin (to taste), and lastly add enough water to make 60 Cc.

4. *Castor Oil Emulsion with Chocolade.* [*For 60 Cc.*]—Castor oil (good quality), 30 Cc.; Powd. acacia, 6.5 Gm.; Powd. tragacanth, .25 Gm.; Soluble cacao (any kind adapted for soda syrup), 1 Gm.; Comp. tr. vanillin (N. F.), 1 Cc.; Solution of saccharin (N. F.), 4 to 5 drops; Water, q. s., 60 Cc. Dissolve the cacao in 15 Cc. of boiling water, and cool; when cold add the comp. tr. of vanillin and the solution of saccharin, and use this mixture in making the nucleus emulsion, employing the continental method, as directed in the preceding formulas. Lastly add enough water to make 60 Cc.

—Proc. Ind. Pharm. Assoc., 1900, 37–.

EXTRACTA.

Powdered Extracts — Ideal Form. — S. W. Williams, in search for the "ideal" powdered extract, reviews the different official and commercial forms that have been and are in use, including the abstracts, which were official during a decade, but are so no longer. The author evidently favors the latter. He says: "If abstracts were official in the present United States Pharmacopœia, we should be ready now to perfect some of them by standardization; but this would not necessarily alter their uniform relation to their respective drugs of one to two. Instead of one part representing two parts of drug of unknown and widely varying strength, one

part could easily be made to represent two parts of crude drug of a definite strength as based upon the average of the most trustworthy assays on record. The step taken in 1880 would not have to be retracted in moving on toward (we might say to) the ideal powdered extract." Physicians would probably have taken more kindly to them if they had possessed a definite relationship to the extract, the dose of which the prescriber would naturally have in mind. This idea apparently obtains in Germany, where a general formula directs powdered extracts to be made half strength by employing powdered liquorice root in proper proportion. Where the extracts are standardized, these powders are fairly definite products, actually as well as relatively. A review of Prof. Patch's statistics of 27,000 prescriptions reveals that their extracts were prescribed on an average more than twice as often as the powdered drug and fluid extract combined, although the reverse is true in the case of aconite, digitalis and jalap. Considering the convenience of physicians in readily calculating dosage from that of the preparation they most frequently prescribe, it is evident that half the strength of the extract more naturally suggests itself than does twice the strength of the drug or fluid extract. Viewed in this light, a general formula for 50 per cent. powdered extracts, similar to that given in the German Pharmacopœia, would cover all drugs for which extracts are official, and in a rough way answer the purpose of abstracts. But, if we start with the extract and practically make a 50 per cent. trituration, we sacrifice the advantage offered by abstracts for convenient desiccation at a low temperature.—Drugg. Circ., Jan., 1901, 5.

Powdered Extracts—A Desirable Form when Properly Made.—L. E. Sayre speaks favorably of the powdered form of solid extracts. These are now supplied by manufacturers in a satisfactory form, but they constitute a class of preparations easily within the reach of self-manufacture by the pharmacist. Essentials are, the selection of a pure, sound material, the proper selection of solvents, and a very close study of concentration and desiccation. In the author's experience, a powdered extract will retain its pulverulent form with ordinary care if the preparation be perfectly desiccated before it is bottled. Drying over the water bath is not sufficient. The final drying may be successfully accomplished by placing the flat-bottomed vessel containing the extract into a larger vessel containing calcium chloride, previously rendered anhydrous at a high heat, but one insufficient to melt it, and enclosing the whole in an air-tight vessel for a day or more. This plan is quite suitable for small operations, such as any retail pharmacist might employ. The author also reports the results and the methods employed for the

Assay of Powdered Commercial Extracts, by C. C. Malcolm, the percentage of total alkaloids being as follows for the powdered extracts of the drugs named: Nux vomica, 15.5 per cent. (solid extract of the same

firm, 14.9 per cent.); belladonna, 1.49 per cent.; aconite, 1.8 per cent.; hyoscyamus, 0.38 per cent.—Drugg. Circ., Nov., 1900, 224.

Extract of Amanita Muscaria—Preparation.—Owing to the instability of the alkaloid muscarine, it is suggested in "Bull. des Scien. Pharm.," that an alcoholic extract of the fly agaric be prepared as follows: One kilo of the fresh and carefully picked over fungi are extracted with alcohol 95 per cent. and tartaric acid. The fungi are first cut up and partially dried at 40° C., then pounded with tartaric acid, and extracted with boiling alcohol in an extractor. The liquid is filtered, the solvent distilled off and the residue evaporated to dryness *in vacuo*. It is then extracted with water acidulated with tartaric acid, neutralized and again evaporated to dryness *in vacuo*. The name *muscarium* has been given to the extract thus obtained, which is prescribed in doses of 1 to 5 centigrammes in 24 hours in cases of digestive atony.—Pharm. Journ., April 27, 1901, 517; from Rev. Pharm., *11*, 42.

Aqueous Extracts of Ergot—Inefficiency Based on Alkaloid-Content.—Dr. J. A. Menlenhopp, referring to the aqueous extracts of ergot of the Netherl. Pharm.—one of them prepared by dialysis—contends that in the light of modern investigation an efficient extract of ergot cannot be obtained by extracting the drug with water. Sclerotic (or ergotinic) acid is no longer considered an important active constituent, the activity of ergot residing in the alkaloidal constituents and in sphacelinic acid, neither of which are found in their proper quantities in the aqueous extracts of ergot. The author has determined the alkaloid in both Dutch and German ergots and ascertained the following percentages: Dutch (1897), 0.11 per cent.; (1898), 0.0976 per cent.; German (1895), 0.324 per cent.; (1897), 0.327 per cent.; sample, at least 5 years old, 0.298 per cent. He prepared two extracts from German ergot, the one by macerating thrice, the other by boiling three times with water. The extract obtained by maceration amounted to 19.25 per cent., and contained alkaloid amounting to 0.043 per cent of the drug. The extract obtained by decoction amounted to 14.75 per cent., and the extracted alkaloid, compared to drug, to 0.05 per cent. The exhausted drug in the first case retained 0.25 per cent. of alkaloid, and in the second to 0.3 per cent. The methods of the Netherland Pharmacopœia, as well as all other methods of preparing extracts of ergot by simple extraction with water, should be dismissed.—Apoth. Ztg., Aug. 22, 1900, 575; from Pharm. Weekbl., Aug. 4, 1900.

Extract of Nux Vomica — Substitution of Paraffin for Ether in the Official Process. — Ferdinand A. Sieker, having experimentally satisfied himself that paraffin, when shaken with the extract of nux vomica, obtained according to the official directions, separates none of the alkaloid, while separating practically everything that ether will separate, and, in addition, an insoluble brown substance that ether does not separate, recommends it for the separation of the fixed oil in place of the ether

now officially directed to be used for this purpose. It is, moreover, cheaper, is not dangerously inflammable, and separates easily on cooling even during the ordinary summer temperature. The percolate from 1000 parts of nux vomica having been subjected to distillation for the recovery of alcohol, and the residue diluted with water to 550 parts, as officially directed, 40 parts of paraffin m. p. about 52° C. are added, the mixture is heated to 70° or 80° C., and *briskly stirred* for ½ hour. It is then set aside for 24 hours in a place where it cools slowly, so that the paraffin may rise to the top before congealing. The paraffin being removed, the residual liquid is treated in the same way with a fresh quantity of 30 parts of paraffin, and when this has been removed, the two portions of paraffin are warmed with 40 parts of water acidulated with acetic acid, congealed as before, and the washings added to the concentrated solution of the extract, which, after straining through close muslin, is evaporated to dryness, and finished as officially directed.—Pharm. Rev., Feb., 1901, 56–60.

"Rhubarb Concentrate"—Preparation and Yield from Different Sorts of Rhubarb.—H. L. V. Uhl and L. E. Sayre have prepared a product from different kinds of rhubarb, which they designate as "rhubarb concentrate" under the assumption that it represents the cathartic principle of the drug. In fact, they regard it to be "cathartic acid," and find its physiological action to be quite like that of rhubarb itself, purgation being produced in doses of 0.2 to 0.25 Gm. At the same time, the authors are apparently uncertain that their product represents all the activity of the drug, since it is possible that allied principles are lost in process. To prepare it, 10 Gm. of the powder was macerated for 48 hours in 95 per cent. alcohol, percolated to exhaustion to remove chrysophanic acid, resins, etc., and the marc from this, after drying, was macerated and percolated to exhaustion, using for this second percolation 60 per cent. alcohol. The tincture thus obtained was evaporated on a water bath, stirring constantly, to a syrupy condition, at a temperature of 50° C. To the concentrated liquid (now about 10 Cc.) 85 per cent. alcohol was added to precipitate the gum. After standing 24 hours the whole was thrown upon a filter. The filtrate was concentrated as before and poured, with constant stirring, into absolute alcohol. The cathartic acid which collected at the bottom of the vessel was then purified. To collect, purify, and dry the product requires a little skill, as the acid precipitates as a semi-solid mass. When the supernatant liquid is entirely removed from the precipitate, the latter is dried at a low temperature in a current of warm air and under diminished pressure. If before drying the magma be spread upon plates of glass in thin layers, it will furnish a dry scale which is quite permanent in dry air. When freshly precipitated it is of a yellowish color, but upon drying it becomes considerably darkened, and, when scraped from the glass plates, is quite glossy in appearance. In a moist atmosphere the acid betrays a hygroscopic character. It is soluble

in cold water, very soluble in hot water and in diluted alcohol, but insoluble in absolute alcohol or ether. Its taste is slightly astringent and somewhat bitter. The yields of this "concentrate" from the several kinds of rhubarb experimented on were as follows: Shensi, 4.9 per cent.; Canton, 4.56 per cent.; Shanghai, 4.7 per cent.—Drugg. Circ., Oct., 1900, 198.

Rhubarb "Concentrate" or "Fluid Extract?"—A Question of Efficiency.—In their above paper on "Rhubarb Concentrate," the authors claim that rhubarb preparations made from their "concentrate" (or cathartic acid) would be decidedly better and more uniform than if prepared from the fluid extract. S. W. Williams, in a dispassionate criticism of the claims advanced by these authors, calls attention to the fact that the testimony of the most competent authorities on the physiological action of rhubarb and its preparations agrees that the desirable qualities of the drug do not reside in a single principle, but in a combination of them, notably the remarkable singularity of the union of a cathartic with an astringent power. It may be that the "concentrate," similar to podophyllin and aloin, will have its distinct advantages for some purposes, but it cannot replace the fluid extract for all purposes, and it seems reasonable to conclude that each preparation may well be a law to itself—the "concentrate" probably proving desirable—the most desirable representation of rhubarb in pills, the "fluid extract" most likely the more favored form for making the liquid preparations.—Drugg. Circ., Nov., 1900, 223.

EXTRACTA FLUIDA.

Fluid Extracts, Ph. Germ.—Comparative Examination of Standard and Commercial Preparations.—In view of the increasing practice of dispensers to procure their supplies of fluid extracts from manufacturers and the consequent neglect of pharmacists to prepare them in their own laboratories, O. Keller has prepared specimens of the more important fluid extracts of the Germ. Pharm. in strict conformity with the requirements of that standard, and compared his products with fluid extracts supplied by reputable firms in Dresden, Frankfort a/M, Halle, and Cassel—his experiments being confined to the determination of their specific gravities and residues of evaporation. The results are shown in the following table, the first figures in each case—which are displayed—giving the results obtained with the author's own products:

Fluid Extract of	Specific Gravity.	Residue Per cent.	Age		Remarks.
			of Drug.	of Fluid Extract.	
Cascara	*1.0830*	*33.6*	Last year.	Fresh.	
Cascara	1.0310	27.0	Several years.	Several years.	
Cascara	1.0090	21.6	Two years.	About 6 months.	Deposit abundant after several weeks.
Cascara	1.0700	31.0	?	Ab. 1 month.	Small deposit.
Calumba	*1.0265*	*23.7*	Last year.	Fresh.	
Calumba	0.9370	4.5	?	Fresh.	Small deposit.
Calumba	0.9450	9.5	?	Ab. 10 months.	
Condurango .	*1.0150*	*20.6*	Last year.	Fresh.	Faint deposit.
Condurango .	1.0055	12.0	?	Ab. 5 months.	
Condurango .	1.0085	21.0	Last year.	Fresh.	
Condurango .	0.9620	17.0	Two years.	Ab. 6 mo.	
Condurango .	0.9770	19.9	?	Ab. 3 mo.	Deposit: faint.
Frangula	*1.0440*	*22.0*	Two years.	Fresh.	Deposit: faint.
Frangula	0.9960	7.1	Several years.	Several years.	
Frangula	1.0090	11.2	Two years.	Ab. 6 mo.	Deposit: faint.
Frangula	1.0270	16.1	?	Ab. 10 mo.	Deposit: faint.
Hamamelis ..	*1.0165*	*23.1*	Last year.	Fresh.	
Hamamelis ..	1.0255	19.7	Several years.	Several years.	
Hamamelis ..	0.9755	13.5	Last year.	Fresh.	
Hamamelis ..	1.0559	24.9	?	Ab. 4 mo.	
Hydrastis ...	*0.9780*	*26.7*	Last year.	Fresh.	
Hydrastis ...	0.9540	21.0	?	Ab. 6 mo.	
Hydrastis ...	0.9540	16.3	Last year.	Fresh.	Small deposit.
Hydrastis ...	0.9755	16.1	?	Ab. 2 mo.	
Ergot	*1.0590*	18.7	Last year.	Fresh.	Small deposit.
Ergot	1.0250	12.7	?	Ab. 6 mo.	
Ergot	1.0290	12.0	Last year.	Fresh.	
Ergot	1.0360	13.7	?	Ab. 6 mo.	
Ergot	1.0420	16.2	?	Ab. 2 mo.	Small deposit.
Viburnum ...	*0.9510*	16.7	Last year.	Fresh.	
Viburnum ...	0.9775	12.5	Several years.	Several years.	
Viburnum ...	0.9745	9.8	?	Fresh.	Small deposit.
Viburnum ...	0.9900	20.7	?	Ab. 4 mo.	

The results show that the fluid extracts proposed by the author are superior to the manufactured products both in quality and yield of residue,

the specific gravity also being higher. The great disparity noted in the case of calumba is apparently due to difference in the method of preparation and in the menstruum—the author's product containing glycerin. The age of the drug, also, appears to be concerned in the yield of residue —this being notably the case with cascara and condurango. It is evident, therefore, that a minimum yield of residue as well as a maximum should be established.—Apoth.-Ztg., Sept. 19, 1900, 652.

Acetic Fluid Extracts—Comparative Experiments with Buckthorn and Cascara Sagrada.—In continuation of his experiments on acetic acid as a substitute for ethyl alcohol in extracting the active principles of some official drugs (see Proceedings, 1899, p. 420 and 1900, p. 469), Dr. Edward R. Squibb contributes a fourth paper in which he records the results obtained with buckthorn bark (*Rhamnus frangula*) and cascara sagrada (*Rhamnus purshiana*). These drugs were selected in order to determine the comparative value of the two solvents upon drugs the activity of which is not dependent upon an alkaloid or upon any single or separable active principle, but rather on the total extractive matter of the drug. Omitting the details of the author's very exhaustive experiments, it suffices here to state that the finished fluid extracts gave the following proportions of nearly dry extract:

Fluid Extract of Buckthorn: Made with the U. S. P. menstruum, 22.3 per cent.; made with 10 per cent. acetic acid as menstruum, 22.5 per cent. The latter retained 8.8 per cent. of acetic acid, but when made by the author's process of repercolation, it contained only 7.7 per cent. of free acid.

Fluid Extract of Cascara: Made with U. S. P. menstruum, 32.5 per cent.; made with 10 per cent. acetic acid as menstruum, 42.7 per cent. The latter retained 9.7 per cent. of acetic acid, but when made by the process of repercolation it contained only 7.8 per cent. of free acid.

Physiological experiments made with these different products, while not claimed to be absolutely accurate in results, fairly establish the conclusion that the acid menstruum is at least fully equal to the alcoholic, with all possible differences in favor of the acid.—Amer. Journ. Pharm., July, 1900, 311–319.

Liquid and Solid Extracts of Belladonna, B. P.—Conclusions Concerning the Official Process.—Edmund White communicates the results of a critical and experimental review of the B. P. processes for making the liquid and solid extract of belladonna. The first is made by simple percolation from the root, based on a process proposed by Cripps, with a menstruum composed of 7 volumes of 90 per cent. alcohol and 1 volume of water, and is not expected to exhaust the drug completely, being adjusted so as to contain a certain percentage of extractive, and a definite ratio of alkaloid to extractive, or 0.75 per cent. of total alkaloid. The official directions for preparing the alcoholic extract are: Evaporate 50

Cc. of the liquid extract of belladonna in a counterpoised basin, on a water-bath to the consistency of a moderately firm extract; weigh. The difference between the weight of the residue and 37.5 grammes gives the weight of milk sugar to be used as a diluent for each 50 Cc. of the liquid extract. The main portion of the liquid extract is then to be evaporated to a thin syrup, the required quantity of milk sugar incorporated, and the mixture evaporated to the required weight. The extract so obtained contains 1 per cent. of total alkaloid, and is intended to replace the former extract of belladonna leaves. On the basis of his experiments, and data obtained from other sources, the author draws the following conclusions:

(1) The liquid extract should be produced by cold percolation only.

(2) No addition of evaporated liquor should be made.

(3) Prepared by the official process the liquid extract has the following characters: Sp. gr., about 0.920; color, resembling sherry; ratio of total solids to alkaloid, about 16 : 1; total dry solids, abont 12 per cent.

(4) The alcoholic extract should be a yellow-brown slightly coherent powder.

(5) It should show little alteration in weight when exposed to air.

(6) It is desirable to adopt an official standard of at least 0.4 per cent. of alkaloids for belladonna root, in order to ensure the presence of the necessary amount of alkaloid in the percolate which constitutes the liquid extract obtained by the official process. — Pharm. Journ., Feb. 23, 1901, 196–198.

Liquid Extract of Cascara, B. P.— Comparative Examination of Trade Samples.—Geo. F. Merson has made a comparative examination of 10 samples of liquid extract of cascara, designated as "B. P."—8 of them the product of different manufacturers, 2 of them prepared in pharmacies—with the object of ascertaining whether or not there was a reasonable degree of uniformity in this article as supplied to the trade. The results are shown in the following table:

No.	Sp. Gr. at 60° F.	Grammes Dry Extractive per 100 Cc.	Sp. Gr. of Distillate.	Per cent. Absolute Alcohol by Volume.
1	1.04099	19.12	0.9715	24.58
2	1.06475	24.58	0.9770	19.28
3	1.04970	20.40	0.9750	21.19
4	1.05467	28.45	0.9680	27.68
5	1.07824	28.60	0.9760	20.24
6	1.06213	24.35	0.9773	19.03
7	1.05813	23.58	0.9771	19.08
8	1.19853	53.80*	.....	....
9	1.06156	23.17	0.9773	19.03
10	1.05486	18.82	0.9813	15.55

* 25 per cent. glycerin or more.

From this table it will be seen that 23 to 25 per cent. of dry extractive (w/v) is an average yield. This factor, however, as likewise the sp. gr. and spirit-content, is by itself insufficient as a test of quality, although it perhaps affords the readiest means of checking the fluid extract, and if used in conjunction with sp. gr. is a fairly reliable guide. A high sp. gr. does not necessarily imply deficiency of alcohol (No. 5), nor does a low one indicate a low yield of dry extractive (No. 4). It should be noted also that increase of the proportion of alcohol decreases very appreciably the percentage of extractive, owing to precipitation by the spirit. To summarize :

An average liquid extract should have :

(1) Sp. gr. at 60° F. approximately 1.0615 ;

(2) Should yield, treated as above, from 23.5 to 25 grammes dry extract per 100 Cc. ;

(3) And contain about 19.25 per cent. absolute alcohol by volume.

—Chem. and Drugg., Jan. 5, 1901, 20.

Fluid Extract of Cascara—Process for Making an Active and Tasteless Preparation.—A. Aweng recommends the following process for preparing an active and tasteless fluid extract of cascara, which depends upon the removal of the intensely bitter glucoside emodin, present to the extent of as much as 3 per cent., while the tasteless frangulic acid, amounting to as much as 16 per cent., is retained : Macerate 1,000 Gm. of coarsely powdered cascara twice successively with sufficient water to well cover it, running off the infusion each time after six hours, and finally subjecting the dregs to expression. The infusion, amounting to about 2.5 liters, is then mixed with 200 Cc. of solution of ammonia, and evaporated to 800 Cc. on a water-bath so as to drive off the ammonia completely. The liquid is then allowed to cool, treated with milk of lime until it gives an alkaline reaction, shaken thoroughly and allowed to stand four days, after which it is filtered. The filtrate should give an alkaline reaction due to excess of lime, which is removed by acidulation with tartaric acid. It is again allowed to stand, this time for eight days, filtered, 200 Cc. of alcohol added, and the final weight adjusted to 1,000 Gm. The glucoside emodin is completely precipitated by the excess of lime employed.—Oester. Zeitschr. f. Pharm., 1900, 55–56.

Fluid Extract of Condurango—Criticism of the Preparation of the Germ. and Swiss Pharmacopœias.—J. Warin finds that a simple menstruum of alcohol, 45 per cent., employed to extract powdered condurango bark in No. 70 powder, by the usual method of macero-percolation for the preparation of a "valoid" fluid extract, gives better results than the glycerin, alcohol, and water menstruum official in the German and Swiss Pharmacopœias. He further states that the qualitative tests in those works, in which the extract, diluted with 4 volumes of water heated to aggregate the resin, and filtered when cold, is required to give a floc-

culent precipitate with a solution of tannin, is capable of quantitative application. Ten Cc. of the extract is diluted with water, 40 Cc., and boiled. It is then cooled to allow the condurangine thrown out by heating to re-dissolve in the cold liquid and filtered; the precipitate being washed with water, 100 Cc. If this be done through a tared filter, the separated resin may be dried and weighed. The filtrate is then treated with 150 drops of a 4 per cent. solution of tannin. The precipitated alkaloidal tannin compound is collected on a tared filter, washed with water, 100 Cc., dried and weighed. The extract of the Swiss Pharmacopœia gave by this method 0.22 per cent. of resin, and 1.46 per cent. of tannin alkaloidal precipitate; that of the Ph. G., IV., 0.25 per cent. of resin, and 1.8 per cent. of tannin alkaloid compound; while the extract prepared with alcohol, 45 per cent., gave 0.56 per cent. of resin, and 3.65 per cent. of tannin precipitate. An experiment performed with a weaker alcohol (30 per cent.) gave an inferior alkaloidal value, and one with stronger alcohol, 70 per cent., gave less alkaloid but more resin, and did not keep without depositing. It is concluded, therefore, that alcohol, 45 per cent., affords the most suitable menstruum for the preparation of this fluid extract.—Pharm. Journ., June 15, 1901, 747; from Journ. de Pharm. [6], *13*, 506.

Soluble Extract of Ginger Ale — Formula for Soda Fountain Use. — John A. Foote gives three formulas for soluble extract of ginger ale, two of them for bottlers' use, the other for the use of the soda fountain. The latter is as follows:

Jamaica ginger, in fine powder	8 lb.
Capsicum, in fine powder	6 oz.
Alcohol, a sufficient quantity.	

Mix the powders intimately, moisten them with a sufficient quantity of alcohol, and set aside for four hours. Pack in a cylindrical percolator, and percolate with alcohol until 10 pints of percolate have resulted. Place the percolate in a bottle of the capacity of 16 pints, and add to it 2 fluid drachms of oleoresin of ginger; shake, add 2½ pounds of finely powdered pumice stone, and agitate thoroughly, at intervals of one-half hour for twelve hours. Then add 14 pints of water in quantities of 1 pint at each addition, shaking briskly meanwhile. This part of the operation is most important. Set the mixture aside for twenty-four hours, agitating it strongly every hour or so during that period. Then take:

Oil of lemon	1½ fl. oz.
Oil of rose (or geranium)	3 fl. drams
Oil of bergamot	2 fl. drams
Oil of cinnamon	3 fl. drams
Magnesium carbonate	3 fl. oz.

Rub the oils with the magnesia in a large mortar, and add nine ounces

of the clear portion of the ginger mixture, to which has been previously added 2 ounces of alcohol, and continue trituration, rinsing out the mortar with the ginger mixture. Pass the ginger mixture through a double filter, and add through the filter the mixture of oils and magnesia. Finally, pass enough water through the filter to make the resulting product measure 24 pints, or 3 gallons. (To be used in the proportion of 4 ounces of extract to 1 gallon of syrup.) — Amer. Drugg., May 13, 1901, 251.

Fluid Extract of Horsechestnuts—A Local Remedy for Rheumatism, Neuralgia, etc.—According to B. Schürmayer a fluid extract prepared from the seeds of the horsechestnut is an efficient and innocuous remedy for the treatment of rheumatism, neuralgia, etc. It is applied locally both undiluted and diluted. Horsechestnuts have recently been the subject of chemical investigation by E. Laves (see under "Materia Medica"), these seeds being now employed in the preparation of nutrient compounds.—Pharm. Ztg., June 12, 1901, 471.

Liquid Extract of Ipecacuanha, B. P.—Stability.—H. Wippell Gadd, in view of the frequent assertions by pharmacists that the B. P. galenical preparations of ipecacuanha deteriorate rapidly, has made a series of determinations of the official liquid extract and of the wine and vinegar made from it, and finds, to the contrary, that these are quite stable. A sample of liquid extract made in February, 1900, yielded 2.3 per cent. of alkaloids, and again the same yield when assayed on June 21 following. The same was practically true of wine made from the same extract, and also of vinegar made in March and examined in June. No extra precautions were taken in the preparation of any of these galenicals.—Chem. & Drugg., Jan. 5, 1901, 21.

Fluid Extract of Licorice Root—A Thick and Dark Preparation a Desideratum.—Prof. Francis Hemm states that in his experience there is a desire manifested by physicians for a thicker and darker fluid extract of licorice than is obtainable by the official process, which directs the use of select decorticated root. The official preparation, while very sweet and nice, is not so desirable for quinine mixture as is the thicker preparation. —Proc. Mo. Pharm. Assoc., 1900, 56.

Acetic Fluid Extract of Squill—Utility for Preparing the Vinegar, Oxymel and Syrup of Squill, B. P.—Geo. F. Merson suggests the preparation of an acetic fluid extract of squill in the proportion 1 : 1 from roughly bruised squill by the process of repercolation with 33 per cent. acetic acid. To a syrup made by dissolving in the usual way 38 ozs. of sugar in 17½ ozs. of water and allowed to cool just short of crystallization, 2½ ozs. of this fluid extract is added, the weight being finally adjusted to 3 lbs. 10 ozs. by the addition of water. As the fluid extract just mentioned is somewhat viscous and tedious to make withal, perhaps a 1 in 2 acetic percolate

would be preferable, the menstruum employed being a mixture of equal volumes of B. P. acetic acid and water. Fifteen ozs. of water would then be used in which to dissolve the sugar, and to this thick syrup, before quite cooled, and made up to weight with water, 5 ozs. of the acetum scillæ fort. be added. Similarly diluted with water to double and quadruple its bulk, the correct strength for oxymel and vinegar respectively is arrived at.—Pharm. Journ., Feb. 23, 1901, 208.

GLYCERITA.

Glycerinum Acidi Borici, B. P.—Advantageous Replacement by a Simple Solution.—David Gilmore contends that the glycerinum acidi borici admitted into the B. P. 1898 is objectionable on three grounds: (1) That the process is tedious and unnecessary; (2) that it is inelegant to dispense, and (3) that from its viscosity it fails in its purpose on application. He concludes that the therapeutic value of boric acid, as free acid, is so generally recognized that a simple solution in glycerin, 1 : 4, would make a satisfactory throat application. If, on the other hand, glyceryl borate is proved to have virtues not in the simple solution, glycerin ought to be added till the strength is reduced to at least 1 : 5.—Pharm. Journ., Jan. 19, 1901, 54.

INFUSA.

Concentrated Liquors, B. P.—Amount of Deposit on Keeping.—The concentrated infusions, which have been introduced into the B. P., 1898, have been the subject of numerous unfavorable criticisms, and particularly those of krameria and calumba, on account of the deposits which form in these on standing. With the purpose of ascertaining the extent to which these criticisms are justified, Frederick Bascomb has determined the amount of solid residue after standing one week, and again after standing a year, in the concentrated liquors enumerated in the table, and also determined their specific gravities, with results as follows:

	Sp. gr. at 15.5° C.	Extractive at 100° C.	Extractive after standing a Year.
Liq. calumbæ conc.	1.015	5.85	3.05
Liq. chiratæ conc.	0.999	4.56	3.86
Liq. cusparıæ conc.	1.016	9.65	8.18
Liq. kramarıæ conc.	1.008	7.47	5.17
Liq. quassiæ conc	0.979	0.25	0.25
Liq. rhei conc	1.036	13.67	12.56
Liq. sarsæ co. conc.	1.038	11.91	10.24
Liq. senegæ conc	1.048	20.16	16.39
Liq. sennæ conc	1.015	10.28	8.66
Liq. serpentarıæ conc.	1.002	5.25	4.97

The author agrees with Alcock and Abraham in condemning the

calumba and rhatany liquors. Moreover, the processes for many of these liquors are cumbersome, and require so much time that, in the case of senna, for instance, fungoid growth would probably accumulate during summer weather before the process is ended.—Chem. and Drugg., Jan. 5, 1901, 20.

Concentrated Infusion of Senega — Preparation. — Harold Wyatt, Jr., has prepared a concentrated (1 : 7) infusion of senega satisfactorily by the following process: Take 16 ozs. of senega root in No. 10 powder, moisten it with 40 ozs. of chloroform water (saturated), and 240 minims of strong solution of ammonia, and macerate for twelve hours, then press slowly in a stout linen bag. When the liquid is all expressed, set it aside and macerate the marc for two hours with 10 ozs. more of the chloroform water, but without ammonia, repeating the pressure and maceration until 36 fl. ozs. of liquor have been obtained, to which finally add 4 ozs. of rectified spirit. The infusion made by diluting this concentrated preparation when compared with the fresh infusion, B. P., was brighter and deeper in color. When made without ammonia it was simply brighter in color. But in either case, the aroma was softer than that of the fresh infusion, and the taste equally characteristic, but not quite as unpleasant. — Pharm. Journ., Oct. 20, 1900, 458.

LIQUORES.

Liquor Ferri Perchloridi Fortis, B. P.—Conflicting Requirements of Specific Gravity and Percentage of Iron Chloride.—Thomas Tyrer and Albert Levy have investigated the causes for controversy concerning the relation of percentage and specific gravity of the official liquor ferri perchloridi fortis which have been proved by Bird (see Proceedings, 1900, 485) and others to conflict with the B. P. 1898 requirement. They review the process and requirement of the B. P., 1885, have prepared the solution in strict conformity with the B. P., 1898, and also from the dry ferric chloride so as to conform to the official specific gravity = 1.42, and have arrived at the conclusion that even with the greatest care in following the B. P. direction, it is impossible to obtain a preparation that with a sp. gr. of 1.42 shall yield from 5 Cc., under the conditions of the official test, 1.6 Gm. of Fe_2O_3, whilst the best samples obtained in commerce, and not made according to the B. P., 1898, are of a percentage within the B. P., 1885, a return to which is advised.—Trans. Brit. Pharm. Conf., 1900, 481–489.

Liquor Ferri et Cacao—Formula.—The "Pharm. Post" (*33*, 639) gives the following formula for a solution of iron and cacao: Fat free cacao, 20 Gm.; water, 200 Gm.; alcohol (90 per cent.), 240 Gm., are digested together for three days and then filtered. To the filtrate add syrup of saccharated iron oxide, Ph. G. (6.6 per cent.), 33 Gm.; simple syrup, 240 Gm.; tincture of orange, 3 Gm.; aromatic tincture, 1.5 Gm.;

tincture of vanilla, 1.5 Gm.; and acetic ether, 5 drops, and finally make up with water to 1,000 Gm.

Solution of Hypophosphites, Compound — Formula. — Ferdinand A. Sieker communicates the following formula for a compound solution of hypophosphites, containing no sugar, which yields a preparation that is similar to that found in commerce:

Dissolve 4.38 Gm. of ferric hypophosphite and 2.20 Gm. of manganese hypophosphite with the aid of 5.5 Gm. of potassium citrate and 0.7 Gm. of citric acid in 150 Cc. of water by boiling. Dissolve 2.14 Gm. of quinine (alkaloid) by boiling it with 200 Cc. of water containing 5 55 Cc. of diluted hypophosphorous acid (10 per cent.). This solution should have a distinct acid reaction toward blue litmus paper. Mix the two solutions, add 8.75 Gm. of calcium hypophosphite, 8.75 Gm. of potassium hypophosphite, and 2.20 Gm. of sodium hypophosphite, 0.0685 Gm. of strychnine sulphate and sufficient water to make 625 Cc., warming the mixture until solution is effected. To the cool solution add 250 Cc. of glycerin, 8.5 Cc. of compound spirit of orange previously mixed with 90 Cc. of alcohol, and 8 Cc. of solution of saccharin (N. F.). Filter, and pass sufficient water through the filter to make 1000 Cc. The saccharin used for the solution of saccharin (N. F.) should be that which possesses 500 times the sweetness of cane sugar.—Pharm. Rev., Sept., 1900, 409.

Solution of Hypophosphites Compound, Without Sugar — Formula. — John H. Hayden, Jr., recommends the following formula for a sweet solution of hypophosphites, without sugar, which is beautifully clear, yellowish-green, keeps well, and agreeable to take:

Potassium hypophosphite	256 grains.
Calcium hypophosphite	256 grains.
Sodium hypophosphite	64 grains.
Iron hypophosphite	128 grains.
Manganese hypophosphite	64 grains.
Strychnine hypophosphite	2 grains.
Quinine hypophosphite	64 grains.
Potassium citrate gran'l	240 grains.
Citric acid, crystals	80 grains.
Glycerin	1 pint.
Oil orange	8 drops.
Saccharin	40 grains.
Deodorized alcohol	4 fl. ozs.
Distilled water, sufficient to make	4 pints.

Dissolve the potassium hypophosphite, calcium hypophosphite and sodium hypophosphite in one and one-half pints of distilled water. Do not mix the salts dry, but dissolve one salt at a time in the water by agitation. Put the iron hypophosphite, manganese hypophosphite, potassium citrate and citric acid into an evaporating dish with a half pint of distilled water,

and heat gently until the salts dissolve into a clear green solution. Mix this with the first solution. Dissolve the strychnine hypophosphite and quinine hypophosphite in a half pint of distilled water by heat, and add to the other solution; add the glycerin; dissolve the oil of orange and saccharin in the deodorized alcohol and add; and finally, sufficient distilled water to make up the volume to four pints. Allow the solution to stand twenty-four hours, and filter, using a white filter paper and a small amount of talcum to absorb any excess of oil. Avoid contact with iron throughout.—Amer. Drugg., Nov. 26, 1900, 307.

Solution of Lactate of Iron—Formula for a Stable Preparation.—G. Griggi observes that lactate of iron, while soluble only to the amount of 2 per cent. in water at 15°, is soluble to the amount of 12 parts in 100 parts of water at a temperature of 100° C., and that a permanent 10 per cent. solution may be obtained by the addition of 2 per cent. of citric acid. For medicinal use he proposes a 5 per cent. solution prepared as follows: Ferr. lactic, 10.0; acid, citric., 2.0; aq. distillat., 100.0; dissolve by the aid of heat, filter, and add: syrup citri, 100.0 parts.—Apoth. Ztg., Aug. 1, 1900, 522; from Boll. Chim. Farm., 1900.

Liquor Iodi Fortior, B. P.—Manipulation.—George F. Merson calls attention to the difficulties commonly experienced when making liquor iodi fortior, B. P., according to the official directions, and suggests the following method of manipulation which has been found satisfactory in his experience. To the iodine in a flask add about half of the potassium iodide and of the water, shake round for a few moments or until the iodide is entirely dissolved, decant, wash out the flask with about one-third of the alcohol, taking care to decant the liquid free from undissolved particles of iodine. Now add No. 2 portion of the iodide with the remainder of the water and repeat exactly the first step of the process, including washing out with another portion of the alcohol. Finally, rinse flask, funnel, etc., with the remainder of the spirit, and make up to volume. A small glass funnel with a pledget of cotton is placed in the stock bottle, and through this each successive lot of solution is strained. Commercial resublimed iodine frequently contains fragments of cork, shreds of paper, and other foreign matter, and there is no waste here such as would be the case in filtering through paper. The whole process, even when operating on a considerable quantity of materials, occupies less than five minutes.—Pharm. Journ., Feb. 23, 1901, 208.

Effervescent Solutions of Magnesium Carbonate — Formulæ. — W. Jaworksi employs "effervescent magnesia waters" as remedies in digestive derangement, acidity, and constipation. The water is directed to be prepared in two forms, mild and strong,

"*Aqua Magnesiæ Effervescens Mitior*," consisting of magnesium carbonate, 5; magnesium salicylate, 1, dissolved in carbonic acid water, 1000; and

"*Aqua Magnesiæ Effervescens Fortior*," composed of magnesium carbonate, 10; sodium chloride, 5, dissolved in aërated water, 1,000. The dose of the dilute water is half a tumblerful after each meal, for acidity and slight constipation. The stronger water is ordered to be taken once daily, fasting, in doses of 1 to 2½ glassfuls in the course of a quarter or half an hour.—Therap. Monats., *15*, 5.

Solution of Magnesium Citrate—A Good Formula.—Geo. W. Hague finds the following formula, originally suggested by Prof. A. B. Stevens and W. Palmer, to uniformly yield a satisfactory solution of magnesium citrate: Dissolve 26.5 Gm. citric acid in 250 Cc. of water, add 13 Gm. magnesium carbonate, previously triturated with 0.128 Gm. oil of lemon, and then 62 Gm. sugar. When dissolved, filter the solution into a strong bottle having the capacity of 360 Cc., add enough water to nearly fill the bottle, drop in 2 Gm. potassium bicarbonate, and immediately cork and secure the latter as usual. Merck's Rep., April, 1901, 115.

Essence of Pepsin—Manipulation.—Frank E. Miller finds the N. F. formula for essence of pepsin (Liquor Pepsini Aromaticus) to give excellent satisfaction, but finds that the process of filtration is slow, due to the pepsin obstructing the pores of the filter paper. The process may be hastened and a bright, transparent product obtained by using as a clarifying medium paper pulp, made by beating gray filter-paper in an iron mortar with a little water. Stir this pulp in with the pepsin solution and filter through a wetted filter. Lastly the glycerin is added.—West. Drugg., June, 1901, 289.

Solutions of Peptonates—Working Formulas.—E. G. Raeuber communicates the following working formulas for solutions of ferric peptonates, the one contemplating the use of commercial ferric peptonate, the other the preparation of the latter as part of the process, and preferable because of the variability of the dry ferric peptonate of the market:

Solution of Iron and Manganese Peptonate: Dry iron peptonate, 15.5 Gm., and manganese sulphate, 0.4 Gm., are dissolved in water. To this solution is added a mixture of aromatic fluid extract, 2.3 Gm.; tincture of vanilla, 2.4 Gm.; oil of sweet orange, 0.06 Gm.; glycerin, 62.5 Cc.; alcohol, 62.5 Cc.; acetic ether, 0.06 Gm. Sufficient water is then added to make 1 liter and the solution filtered.

Solution of Iron Peptonate is made from egg albumen direct as follows: 400.0 Gm. of fresh egg albumen (or 51 Gm. of the dried) are dissolved in a solution of 0.5 Gm. pepsin and 82.0 Gm. hydrochloric acid in 4 liters of water. This solution is kept at a temperature of 40° C. for from 12 to 24 hours, being tested from time to time by adding a few drops of nitric acid to a portion of the liquid, the absence of unconverted albumen being shown when the addition of nitric acid no longer produces cloudiness. After cooling, the liquid is carefully neutralized with sodium hydroxide

solution: then 586.0 Cc. of solution of iron oxychloride (Ph. Ger.), previously diluted with 4 liters of water, are added and the resultant liquid again neutralized very carefully with sodium hydroxide. This precipitates the iron peptonate, which is carefully washed until free from chlorine. The magma is then placed in a porcelain dish, 7.0 Gm. of hydrochloric acid are added and the mixture is heated on a water-bath, while stirring, until the precipitate is dissolved. Then enough water is added to make 4 liters, followed by the aromatics, glycerin and alcohol in the proportions directed in the first formula, the product being finally brought to 5 liters by the addition of water.—Pharm. Rev., Nov., 1900, 502–503.

Liquor Pancreatis, B. P.—Modification of the Official Test for Verifying its Proteolytic Activity.—The B. P. test for verifying the proteolytic activity of the official pancreatic solution requires that: "If 2 Cc. of the solution, together with 0.2 gramme of sodium bicarbonate and 20 Cc. of water be added to 80 Cc. of milk, and the mixture be kept at a temperature of 113° F. (= 45° C.) for one hour, coagulation should no longer occur on the addition of nitric acid." F. C. J. Bird observes that the test as it stands is hardly as definite as it might be, and at times the point at which coagulation no longer occurs is rather difficult to determine. By experiment, he finds that the test is rendered more sensitive and definite by the use of ether and nitric acid in definite quantities, the test being modified as follows: Following the official directions as given up to the time when nitric acid is to be added, 5 Cc. of the liquid is shaken with an equal volume of ether of sp. gr. 0.717. This should form a clear solution, in which no coagulation should be produced on the addition of 5 *minims* of nitric acid.—Trans. Brit. Pharm. Conf., 1900, 429.

MISTURÆ.

Mixtures—Formulæ of the Philadelphia Hospital.—The following formulæ for mixtures have been adopted in the recently revised edition of the "Pharmacopœia of the Philadelphia Hospital:"

Mistura Camphora (Hope): Tinct. opium, deod., 0.3 Cc.; fuming nitrous acid, 0.24 Cc.; camphor water, enough to measure 15.0 Cc. Dose: A tablespoonful.

Mistura Cardiaca (Da Costa): Solution of nitro-glycerin (1 per cent.) 0.5 Cc.; tinct. belladonna, 0.06 Cc.; tinct. digitalis, 0.3 Cc.; tinct. strophanthus, 0.12 Cc.; chloroform water, enough to measure 40 Cc. Dose: A teaspoonful.

Mistura Cascara: Fl. extr. cascara sag., comp. infus. sarsaparilla, glycerin, of each 1.25 Cc. Dose: One teaspoonful or more, in water.

Mistura Codeinæ et Chloroformi (C–C Mixture, J. W. E.): Codeine sulphate, 0.008 Gm.; dilute hydrocyanic acid, 0.1 Cc.; spir. chloroform,

1.0 Cc.; glycerin. 0.65 Cc.; fl. extr. wild cherry, 0.3 Cc.: elixir orange, enough to make 4.0 Cc. Dose: A teaspoonful in water.

Mistura Creosoti: Creosote (B. W.), 0.12 Cc.; glycerin, 2.0 Cc.; elixir orange, 2.0 Cc.; alcohol, 2.0 Cc.; oil bitter almonds, 0.03 Cc.; comp. tinct. cardamom, enough to make 8.0 Cc. Dose: Two to four teaspoonfuls 3 to 5 times daily.

Mistura Diuretica: Potass. citrate, 0.6 Gm.; potass. acetate, 0.6 Gm.; spir. nitrous ether, 1.0 Cc.; sol. ammon. acet., 4.0 Cc.; syr. citric acid, enough to make 8.0 Cc. Dose: A dessertspoonful.

Mistura Diuretica cum Digitale: The same as the preceding with the addition of tinct. digitalis, 0.3 Cc. Dose: A dessertspoonful.

Mistura Dysenterica (Saline Dysenteric Mixture): Magnesium sulphate, 1.3 Gm.; dil. sulphuric acid, 0.6 Cc.; deod. tinct. opium, 0.6 Cc.; chloroform water, enough to make 8.0 Cc. Dose: A dessertsoonful.

Mistura Enterica: Chloroform, 0.3 Cc.; tinct. capsicum, 0.3 Cc.; arom. sulphuric acid, 0.6 Cc.; spir. camphor, 0.6 Cc.; deod. tinct. opium, 0.6 Cc.; French brandy, enough to make 4.0 Cc. Dose: One teaspoonful.

Mistura Expectorans: Dil. hydrocyanic acid, 00.6 Cc.; spir. chloroform, 0.6 Cc.: hydrobromic acid (34 per cent.), 0.5 Cc.; syr. senega, 0.6 Cc.: syr. squill, 1.0 Cc.; syr. wild cherry, enough to measure 8.0 Cc. Dose: A dessertspoonful.

Mistura Ferri Aperiens: Ferrous sulphate, 0.65 Gm.: magnesium sulphate, 4.0 Gm.; dil. sulphuric acid, 0.5 Cc.; syr. ginger, 4.0 Cc.; inf. quassia, enough to measure 15.0 Cc. Dose: A tablespoonful.

Mistura Ferri et Ammonii Acetatis (Basham's Mixture, Philadelphia Hospital): Tinct. ferric chloride, 0.6 Cc.; dilute acetic acid, 1.0 Cc.; sol. ammon. acet., 8.0 Cc.; elix. orange, 2.0 Cc.; glycerin, 2.0 Cc.; water, enough to measure 15.0 Cc. Dose: A tablespoonful.

NOTE.—This formula is believed to be the original of Dr. W. K. Basham, and differs from the U. S. P. formula of 1890.

Mistura Ferri Salicylatis (S. Solis Cohen): Sodium salicylate, 0.5 Gm.; glycerin, 1.0 Cc.; mucilage acacia, 0.5 Cc.; tinct. ferric chlor., 0.5 Cc.; oil gaultheria, 0.03 Cc.; sol. ammon. citrate, B. P., enough to measure 4 Cc. Dose: One to two teaspoonfuls.

Mistura Ferri Phosphatis (Iron Lemonade): Tinct. ferric chloride, 0.6 Cc.; dilute phosphoric acid, 0.6 Cc.; glycerin, 1.0 Cc.; syr. citric acid, enough to measure 4.0 Cc. Dose: One to two teaspoonfuls.

Mistura Ferri et Potass. Chloratis (Iron Gargle): Tinct. ferric chloride, 8.0 Cc.; acetic acid, 1.0 Cc.; sol. ammon. acet., 15.0 Cc.; sat. sol. potass. chlor., 120.0 Cc.; glycerin, 12.0 Cc.; peppermint water, enough to measure 240.0 Cc. Gargle.

Mistura Ferri et Quininæ Phosphatis: Quinine sulphate, 0.15 Gm.; dil. phosphoric acid, sufficient; soluble iron pyrophosphate, 0.15 Gm.; glycerin, 2.0 Cc.; elix. orange, 4.0 Cc.; sol. ammon. acet., sufficient; water, enough to measure 15.0 Cc. Dose: A tablespoonful.

Mistura Gentianæ Acida: Dil. nitrohydrochloric acid, 0.6 Cc.; comp. infusion gentian, enough to make 15.0 Cc. Dose: A tablespoonful.

Mistura Nucis Acida: Dil. hydrochloric acid, 0.6 Cc.; tinct. nux vomica, 0.6 Cc.; tinct. black pepper, 0.3 Cc.; glycerin, 0.3 Cc.; comp. infus. gentian, enough to measure 4.0 Cc. Dose: A teaspoonful.

Mistura Pectoralis: Ammonium chloride, 0.3 Gm.; arom. spir. ammon., 0.12 Cc.; syr. senega, 0.6 Cc.; comp. licorice mixture, enough to measure 8.0 Cc. Dose: A dessertspoonful to a tablespoonful.

Mistura Pepsinae et Strychninae: Strychnine sulph., 0.001 Gm.; scaled pepsin, 0.15 Gm.; dilute hydrochloric acid, 0.3 Cc.; comp. tinct. cardamom, 0.6 Cc.; water, enough to make 4.0 Cc. Dose: One to two teaspoonfuls.

Mistura Pilocarpinae, Sparteinae et Digitalis (D. E. H.): Pilocarpine nitrate, 0.004 Gm.; sparteine sulphate, 0.016 Gm.; chloroform water, infusion of digitalis, of each (equal measures ? Rep.) enough to make 8.0 Cc. Dose: A dessertspoonful.

Mistura Sodæ (Soda Mint): Sodium bicarbonate, 0.6 Gm.; arom. spir. ammonia, 0.5 Cc.; peppermint water, enough to make 15.0 Cc. Dose: A tablespoonful.

Mistura Sodæ et Rhei: Sodium bicarbonate, 0.2 Gm.; tinct. capsicum, 0.12 Cc.; tinct. nux vomica, 0.3 Cc.; tinct. rhubarb, 2.0 Cc.; peppermint water, enough to make 8.0 Cc.

Mistura Terebeni: Terebene, 0.2 Cc.; oil of gaultheria, 0.06 Cc.; acacia, sufficient; syr. wild cherry, enough to make 4.0 Cc. Dose: One to two teaspoonfuls in water.

Mistura Zollickofferi (Zollickoffer's mixture): Potassium iodide, 0.6 Gm.; guaiac resin, 0.3 Gm.; wine colchicum root, 1.0 Cc.; acacia, sufficient; cinnamon water, syrup of ginger, of each (equal measures ? Rep.) enough to make 15.0 Cc. Dose: A tablespoonful.—Amer. Journ. Pharm., July, 1900, 349–353.

Brown Mixture—Question of Appearance.— Professor Francis Hemm calls attention to the fact that Brown Mixture, when made by the formula of the 1890 Pharmacopœia, is much lighter in color, and contains much less undissolved matter than did the preparations of the older Pharmacopœias. This is mainly due to the direction to use the purified extract of licorice, and, as a matter of fact, a practically clear *solution* should be obtained by the newer formula. Many pharmacists, however, continue to follow the older formulas, using the commercial powdered extract of licorice, partly because of the demand for a *mixture* darker in

color, turbid, and of necessity to be shaken, and partly because of the greater convenience to obtain the powdered extract. It remains a fact, that the public expect a dark-colored and turbid Brown Mixture. If it is desirable to maintain the present formula, direction should be given to filter, or otherwise clarify the preparation, which might then go under the head of solutions rather than of mixtures. — Proc. Mo. Pharm. Assoc., 1900, 55.

Brown Mixture—Improved Manipulation. — S. D. Knox recommends the old-time "Brown Mixture" as being fully equal, if not superior, to the modern preparations, such as "Pine Expectorant," "Pruni Codeine," etc., popularly prescribed in his locality. He, however, gives some advice concerning its preparation, which, while practically the same as the U. S. P., differs in the manipulation. Take:

Extract of glycyrrhiza (soft)	900 grains.
Camph. tinct. opium	8 ounces.
Wine of antimony	4 ounces.
Spirit of nitrous ether	2 ounces.
Granulated acacia	3 ounces.
Granulated sugar	40 ounces.
Water	q. s.

Dissolve the extract licorice in about 20 ounces of water, by the aid of a gentle heat, being careful not to burn. Mix the camp. tinct. opium, spt. nitre and antimony wine, and add to the solution extract licorice, then filter this into a bottle containing the sugar and acacia. Agitate well, and then add water q. s. to make sixty-four ounces; agitate until sugar and acacia are dissolved, then strain.—Proc. Ark. Assoc. Pharm., 1900, 24.

OLEA.

Oleum Carbolatum—Formula of the Philadelphia Hospital.—Carbolic acid, 2.5 per cent.; olive oil, 97.5 per cent.—Amer. Jour. Pharm., July, 1900, 353.

Phosphorated Oil—Precautions in Preparation.—Prof. Francis Hemm, in view of the fact that phosphorated oil is very rapidly oxidized by short exposure to the air, makes use of the following expedient to obviate this change: Using almond oil which had previously been heated to 250° C. and filtered, it was placed into a flask with the necessary quantity of phosphorus and carbonic acid passed into it to completely expel the air. It was then heated on a water-bath, during several hours, to effect complete solution, and afterwards filled into bottles from which the air had been expelled by CO_2 gas.—Proc. Mo. Pharm. Assoc., 1900, 56.

Sulphurated Cod Liver Oil—Preparation.—J. W. M. Nobel has experimented with the object of obtaining a permanent solution of sulphur in cod liver oil, suitable for internal medication. He at first heated 5

Gm. of purified sulphur with 300 Gm. of cod liver oil to about 125° C., when, in seven minutes, the sulphur appeared completely dissolved, but was again deposited on cooling. If the heating was continued at the same temperature for seven hours, however, none of the sulphur was deposited on cooling, nor had it deposited after standing two weeks.—Pharm., Ztg., Dec. 22, 1900, 988; from Pharm. Weekbl.

OLEATA.

Oleates—Practical Working Formulas.—W. A. H. Naylor reviews the methods of preparation, character, etc., of a number of oleates, official and unofficial, and communicates the following working formulas which he has found in practice to yield satisfactory products. The soap used by the author is a genuine olive oil soap of high quality, and contains 15 per cent. of water.

Aluminum Oleate: Dissolve 1 oz. pure potassium alum in 6 fl. ozs. of boiling water and pour the solution, while stirring, into a solution of 2 ozs. of soap in 10 fl. ozs. of boiling water. The clotty precipitate is washed with boiling water by decantation, until free from sulphate, and dried over a water-bath. The oleate is adhesive, of a yellowish-grey color, opaque, and weighs about 2¼ ozs. On ignition it yields 6 per cent. of aluminum oxide (= 3.2 per cent. Al.).

Bismuth Oleate: Instead of crystallized bismuth nitrate, as suggested by Dr. L. Wolff, the subnitrate may advantageously be used as follows: Dissolve 1 oz. of bismuth subnitrate, by the aid of heat, in 5½ fl. drams of nitric acid, diluted with its own volume of distilled water; then dilute the solution with three times its volume of distilled water, and pour it, hot and while stirring, into a hot solution of 3 ozs. of soap and 24 fl. ozs. of water. The precipitate is washed with hot water by decantation, and dried over a water-bath. The yield of dry oleate is about 3 ozs. It has a light citron color and yields on ignition 22 per cent. of bismuth oxide (= 20 per cent. Bi.).

Ferrous Oleate: In spite of all precautions this oleate undergoes considerable oxidation during the process of its preparation, which must therefore be as expeditious as possible. Dissolve 1 oz. of pure ferrous sulphate in 5 fl. ozs. of dist. water and pour the solution while stirring into a solution of 2 ozs. of soap in 16 fl. ozs. of water. When the precipitate produced has been sufficiently washed it should be at once strongly expressed and dried, in the unbroken state of press-cake, at not exceeding 50° C.

Ferric Oleate, on the other hand, is easily and quickly made, by pouring 4 fluid ozs. of solution of iron acetate, B. P., 1898, into a solution of 2½ ozs. of soap in 16 fl. ozs. of boiling water. The washed precipitate, dried on the water-bath, is of a deep red color, weighs a little over 2 ozs., and yields 8 per cent. Fe_2O_3 (= 5.6 Fe) on ignition. It is readily soluble in fixed oils.

Lead oleate is made by the "National Formulary" process. The yield from 3 ozs. of lead acetate and 5 ozs. of soap is about 5½ ozs. It is strongly adhesive, dirty-grey in color, but yields on ignition 25 per cent. of lead oxide, as against the "about 28 per cent." of the N. F.

Mercury oleate is official in the B. P., 1898. Prepared by the official formula quantities and process, the yield is about 2¼ ozs. On assaying the product by a modification of Bennett's process—which depends on the decomposition of the oleate by hypophosphorous acid—the yield of metallic Hg is about 23 per cent., equivalent to 24.35 per cent. mercuric oxide.

Zinc oleate, which is also official in the B. P., 1898, when prepared by the official formula, yields on ignition 11.59 per cent. of ZnO (= 9.3 per cent. Zn), the product obtained from the pharmacopoeial quantities weighing about 3½ ozs. Both in this, and in the formula for mercuric oleate, the quantity of metallic salts ordered is in excess of that required, but this is probably intentional.—Pharm. Journ., March 30, 1901, 392–393.

PILULÆ.

Pills—An Efficient Sweet-tasting Dusting Powder.—A white dusting powder that is not too slippery on the slab and gives a sweet taste at the first touch of the tongue to the pills, is obtained according to John K. Williams by the following formula: Arrow root, starch, rice-flour, milk-sugar, of each 2 ozs.; lycopodium, 4 drachms; German potato-starch, 8 ozs.; saccharin, 30 grains. Mix and pass through a fine sieve.—West. Drugg., July, 1900, 357.

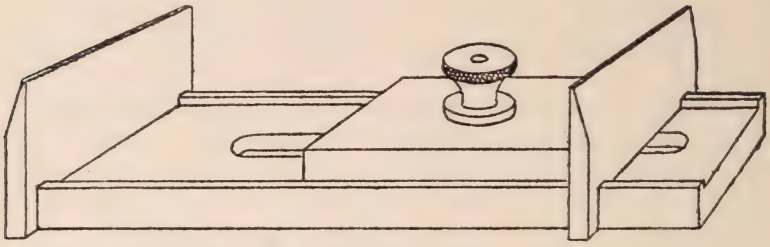
Improved Pill Tile—A Simple Device.—A German manufacturer has patented an improvement on the old-fashioned pill-tile that is likely to come into general use. The improvement consists of a triangular strip or projection along one or more sides, the object of which is to scrape off ointment, etc., from the spatula, to lay the latter on when it is necessary to put it down. The tile is preferably made of celluloid, but an ordinary porcelain tile may easily be provided with a similar strip—a glass chandelier prism for instance—by fastening it on with a good cement.—Bull. Pharm., Aug., 1900, 330.

PULVERES.

Powder Folder—Practical Construction.—I. U. Weills has devised the powder folder shown by Fig. 41, which is free from the faults of the folders as ordinarily constructed, and particularly that of the "saw-buck" pattern, fulfilling the following requirements: Firmness when placed on the counter; simplicity of construction and consequent cheapness; and readiness of change to suit the size of the powders to be made. The author gives a detailed description of the shape and size of the individual parts, which need not be reproduced here, the drawing being so plain as to become

intelligible at a glance. It consists of two small pieces of brass and a small bolt, with milled edge nut for fastening the upper piece, which slides in the groove formed by the turned up edges of the lower piece, and holding it in a rigid position. The outer dimensions of the lower pieces are 4½x2 inches.—Proc. Penn. Pharm. Assoc., 1900, 132–134.

FIG. 41.



Powder Folder.

Pulveres—Formulas of the Philadelphia Hospital.—The following formulas for compound powders have been adopted in the recently revised edition of the "Pharmacopœia of the Philadelphia Hospital:"

Pulveres Acetanilidi Compositi: Acetanilid, sodium bicarbonate, of each, 0.15 Gm. For one powder. Dose: One or two powders.

Pulveres Caffeinæ Compositi: Caffeine (alkaloid), 0.1 Gm.; acetanilid, 0.15 Gm.; sodium salicylate, 0.3 Gm. For one powder. Dose: One or two powders.

Pulveres Bismuthi et Bismuthi: Bismuth subgallate, 0.3 Gm.; bismuth subnitrate, 1.0 Gm. For one powder. Dose: One or two powders.

Pulveres Bismuthi cum Kino: Kino, cinnamon, bismuth subnitrate, of each 0.6 Gm.; bismuth subgallate, 0.3 Gm. For one powder. Dose: One powder every 2 or 3 hours.

Pulveres Bismuthi cum Soda: Bismuth subnitrate, sodium bicarbonate, of each 0.6 Gm. For one powder. Dose: One or two powders.

Pulveres Mercurosi Compositi: Mild chloride of mercury, 0.005 Gm.; powd. ipecac, 0.005 Gm.; powd. black pepper, 0.032 Gm.; sodium bicarbonate, 0.13 Gm. For one powder. Dose: One powder every two hours until six are taken, followed by a saline purgative.

Pulveres Pancreatini cum Soda: Pancreatin, 0.3 Gm.; sodium bicarbonate, 0.6 Gm. For one powder.—Amer. Jour. Pharm., Sept., 1900, 435–436.

Powdered Camphor—Expeditious Method of Powdering.—John K. Williams recommends equal parts of stronger ether and alcohol to reduce camphor to powder, only one-half the time being required than when alcohol alone is used, and it dries quicker. Before sifting add one per

cent. of white vaseline and 5 per cent. of milk-sugar. Triturate fairly dry, spread out in the air, say fifteen minutes, then pass through a moderately fine wire sieve, using a stubby shaving brush to assist in working it through. —Brit. Drugg., July, 1900, 357.

Gregory's Powder—Absorption of Water and Carbon Dioxide.—T. F. Harvey communicates the results of a series of experiments undertaken with the purpose of determining the rate of absorption of water and carbon dioxide in Gregory's powder—"Pulv. Rhei Compositus," B. P.—and the relation of these factors to those ascertained for calcined magnesia. A supposition, borne out by analyses made some time ago, is advanced, that when magnesia oxide is mixed with rhubarb and ginger some of the water contained in the vegetable powder will combine with the MgO to form hydroxide, and conditions favorable to the absorption of water and carbon dioxide from the air will then be produced. From the results obtained by his present investigations, which are exhibited in a table, the author arrives at the following conclusions:

1. Gregory's powder absorbs water and carbon dioxide more rapidly than calcined magnesia.

2. Water is absorbed at first more rapidly than carbon dioxide.

3. The rate of absorption, which is surprisingly rapid on free exposure, slows down considerably on reaching a certain stage.—Chem. & Drugg., Sept. 15, 1900, 475.

Headache Powders—Formulas.—B. S. Cooban recommends two forms of headache powders, both of which he has found quite efficient, phenacetin being used in the one, acetanilid in the other. They are as follows:

Phenacetin Formula:

Phenacetin	4 drachms.
Citrated caffeine	1 drachm.
Sugar of milk	6 drachms.

Mix and divide into ten-grain powders.

Acetanilid Formula:

Acetanilid	7 drachms.
Socium bicarbonate	2 drachms.
Caffeine (alkaloid)	1 drachm.
Extract of belladonna	5 grains.

Mix and divide into five-grain powders.

—Bull. Pharm., Jan., 1901, 16.

Hydrargyrum cum Creta, U. S. P.—Presence of Mercuric Oxide When Made by the Formula of 1890. — Carl G. Hinrichs calls attention to the fact that mercury with chalk, when prepared by the U. S. P. formula of 1890, which directs honey among its component parts, invariably contains mercuric chloride, though this may be present in traces only. He considers it a mistake to introduce honey in this preparation, and suggests

that it should be, as its name implies, and as is the preparation of the B. P. (and as was that of the U. S. P., 1870! Rep.), simply a mixture of mercury with chalk.—Proc. Missouri Pharm. Assoc., 1900, 47.

Seidlitz Powders—Examination.—Joseph Huntingdon calls attention to the fact that examinations of seidlitz powders appear to be principally confined to a determination of the weights of the respective blue and white powders, and that no attempts are made to determine the purity of the ingredients or to ascertain if they have been mixed in the proper proportions. In his somewhat lengthy paper he points out the direction in which experiments should be made, and records the details of the examination of six commercial samples, the result being given in tables accompanying the test. From these it appears that correct weight—if such there be—does not necessarily indicate correct composition. This is particularly so in reference to the mixtures of Rochelle salt and sodium bicarbonates, which may vary considerably. In fact the table shows that none of the mixtures were absolutely correct. The official standard being 25 per cent. of sodium bicarbonate and 75 per cent. of Rochelle salt, in the six samples the percentages of sodium bicarbonate were respectively: 26.8, 23.89, 26.32, 23.48, 41.03 and 26.8 per cent. The variations in weight were also considerable, while none of the salts were strictly pure, though containing only traces of impurities, such as iron, calcium, sulphate and chlorides. The tartaric acid portion, though in no case absolutely correct in weight, was wide of the mark only in one instance; but in other instances the deficiency in the weight of seidlitz mixture caused a great excess of tartaric acid in cases in which the acid itself was nearly in the quantity directed by the U. S. P.—Amer. Journ. Pharm., October, 1900, 461–467.

RESINÆ.

Podophyllum Resin—Sophistication.—Charles H. La Wall and Robt. C. Pursel call attention to a sample of low-priced podophyllum resin which possessed the characteristics of powdered podophyllum root instead of the resin. It was found to be almost completely insoluble in both ether and alcohol.—Proc. Pa. Pharm. Assoc., 1900, 161.

SAPONES.

Soap—Determination of Free Alkali.—Divine recommends the following method for determining the free alkali in soaps: To a solution 2 Gm. of the soap in 50 Cc. of alcohol, contained in a flask provided with a reflux condenser, an excess of $\frac{N}{10}$ stearic acid is added, and the flask heated on a water-bath until a clear solution is obtained. The excess of stearic acid is then determined with $\frac{N}{10}$ soda solution, the difference giving the data for total free alkali, both hydrate and carbonate. In a second experiment with the same quantity of soap, the carbonate is removed by means of 10

per cent. solution of barium chloride, and the remaining free alkali estimated as before. The difference between the total free alkali as previously ascertained and the caustic alkali as ascertained in the second experiment gives the amount of free alkali present as carbonate in the sample.—Pharm. Centralh., Jan. 3, 1901, 7; from Chem. Ztg. (Rep.), 1900, 330.

Sapo Animalis and Sapo Durus, B. P.— Desirability of Official Tests of Distinction. — Edmund White says that although Sapo Animalis and Sapo Durus. B. P., are described as being made with sodium hydroxide and "purified animal fat" and "olive oil" respectively, no tests are given in the official monographs for determining the sources from which they are obtained. The characters of the fatty acids will, however, readily distinguish between the two varieties of soap. Thus, if the soap be dissolved in hot water and dilute sulphuric or hydrochloric acid be added until the liquid is acid to methyl orange, the sodium salts of the fatty acids are decomposed, and the liberated fatty acids, on account of their lower specific gravity, rise to the surface. On allowing the mixture to cool, this layer of fatty acids solidifies, and a determination of its melting point yields the necessary indication, since oleic acid melts at a much lower temperature than stearic acid. The amount of water allowed in the two soaps—viz., 30 per cent.—is perhaps unnecessarily high, since the best commercial varieties will be found to contain always less than this proportion. — Pharm. Journ., Jan. 12, 1901, 29.

Spiritus Saponatns — Formula for a Solid Form. — Vollbrecht recommends a solid form of spirtus saponatus for the disinfection of the hands and skin, which is prepared as follows: 60 Gm. of almond oil soap are heated in a flask with a sufficient quantity of alcohol to effect solution; this is brought to the measure of 1 liter, and then allowed to cool, when it will form a solid mass. — Pharm. Ztg., Jan. 16, 1901, 30; from Pharm. Post, 1900, No. 45.

SPIRITUS.

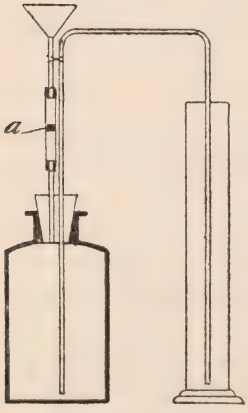
Spirit of Nitrous Ether—Progressive Deterioration.—F. H. Alcock calls attention to possible injustice done by inspectors who frequently keep the samples of spirit of nitrous ether taken for inspection for quite a time before examining it, and often in bottles partly filled and badly corked. As an example of the rapidity with which this spirit deteriorates, he instances that two fluid ounces of spirit of nitrous ether were purchased November 26, 1900, in a round white glass well-corked bottle, and examined immediately by the nitrometer test. Five cubic centimeters gave before the addition of the sulphuric acid 15.0 cubic centimeters of gas, and after the acid a total of 29.2 cubic centimeters. The bottle was again well-corked, inverted in a test-tube rack and left on the laboratory bench until January 17, 1901, when it was again examined by the nitrometer test. Five cubic

centimeters gave without acid 12.0 Cc., and a total of 28.5 Cc. after the acid. On February 16, 1901, 5 Cc. of the same sample gave without acid 10.2 Cc., and with acid 27.0 Cc.—Pharm. Journ., April 13, 1901, 461.

Spirit of Nitrous Ether, B. P.—Commercial Quality and Preservation.—Statements made in open court concerning the unsatisfactory condition in which spirit of nitrous ether was sold, and, further, that it is practically impossible to open a shop bottle containing it without loss and deterioration, induced David Gilmour to undertake a series of investigations, the results of which are substantially as follows: (1) Out of a considerable number of samples supplied by wholesale dealers, only one sample was of bad quality, yielding under the B. P. process of assay only 3.5 volumes of NO, the other samples running all points between a range close to 7 volumes down to 5.5 and 6 volumes, and consequently within the generous limits of the B. P. (2) Spirit of nitrous ether when kept in well-stoppered containers (Winchester quarts in the author's experiment) and in a cool dark place (the cellar) kept well for a period of six months if not opened during that period; but once opened, deterioration commences, and though this may be gradual, yet it goes on steadily. A sample opened at intervals during three months, kept otherwise as described, had deteriorated from 6.33 volumes NO to 5.16 volumes. The most unfavorable conditions are exposure in a bright shop. Essential conditions to its preservation are small, well-closed vessels and a cool dark place.—Pharm. Jour., Jan. 19, 1901, 54–55.

Nitrometer—Simple and Inexpensive Construction.—F. X. Moerk, in connection with a paper on "Gasometric Analysis," describes the apparatus for the estimation of spirit of nitrous ether shown by Fig. 42, which, constructed on the same lines as the nitrometer recommended and described by Dr. E. R. Squibb in 1890 (see Proceedings, 1890, 363), avoids the use of mercury as the liquid to be displaced by the generated gas. He has found that in the use of Squibb's apparatus the air is not perfectly removed and that, notwithstanding that Dr. Squibb had found it impracticable to use brine in place of mercury, in the apparatus now recommended the brine answers the purpose admirably. Moreover, the use of a retort stand, or support of any kind, and of a spring clamp becomes unnecessary, and the entire apparatus may be inexpensively constructed with such material as is usually at hand. A 4-ounce salt-mouth bottle is provided with a double perforated stopper. A short piece of glass tubing is inserted in one of the perforations, flush with the inner end

FIG. 42.

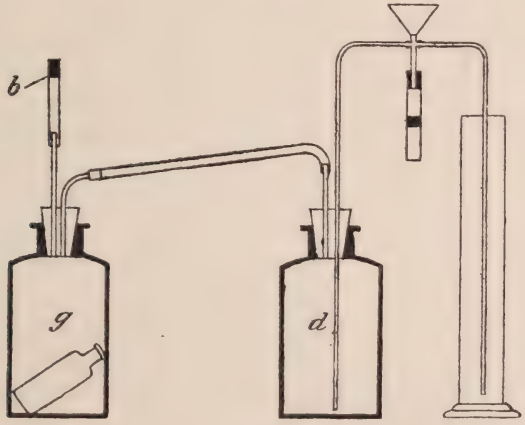


Nitrometer.

of the stopper, and this tube is connected by a short piece of rubber tubing with a small funnel. In this rubber tubing at *a* is placed a small section (¼ to ⅜-inch.) of glass rod with fused ends, and having about the same diameter as the tubing, so that it can be introduced without difficulty, and at the same time tightly close the rubber tubing. On pressing together the rubber tubing about the small glass plug, a small channel is formed, through which a liquid may be caused to descend from the funnel or, by applying suction with the mouth, to draw the fluid from the bottle into the glass tube. The long glass syphon tube, bent twice at right angles and passing through the second perforation in the stopper, serves the purpose of adjusting the brine in the bottle by suction, and as an outflow for the brine into a graduated receiver when the apparatus is in action. Incidentally, also, it serves as a support for the funnel tube, being held to its side by means of a small rubber band. This syphon tube should be bent slightly upwards or its diameter slightly constricted at its outer end so as to prevent air from entering and displacing the brine. The author gives in explicit detail the method of making the assays of *spirit of nitrous ether* and of *sodium nitrite* by the aid of this apparatus, but this operation is so familiar to those accustomed to making such estimations that the details may be omitted here.

For the estimation of *urea*, *hydrogen dioxide*, etc., the author suggests the modification of the apparatus shown by Fig. 43. By the aid of the rubber

FIG. 43.

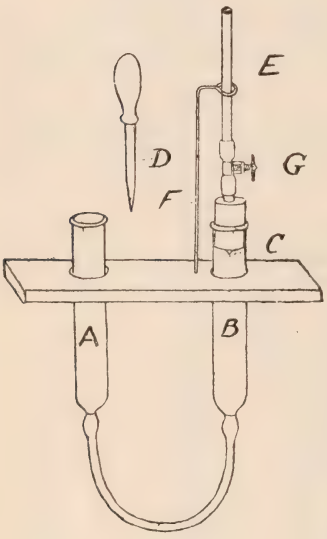


band holding the funnel as shown in Fig. 42 against the syphon tube, the rubber tube bearing the funnel is slipped on to the horizontal arm of the syphon and there, for convenience, suspended. A second 4-ounce salt-mouth bottle, *g*, bearing in a suitably perforated stopper a small straight tube and a small bent tube, is then attached by means of a six-inch section of rubber tubing to the original 4-ounce bottle, *d*, as shown, while the small straight tube in the second 4-ounce bottle, *g*, is surmounted by a

short section of rubber tubing, which is closed at *b* with a piece of glass rod. This second bottle, *g*, serves as a generator in which the urea in the sample of urine is decomposed by means of Labarraque's solution, 40 Cc. of which are placed into the generator, while 4 Cc. of the urine are placed into a ⅛ oz. homeopathic vial and introduced into the generator as shown in the drawing. The first bottle, *d*, having been filled completely with water, all the connections are made and, having become assured that these are tight, the generator *g* is inclined in such manner that the urine may mix with the Labarraque's solution. The generated gas then forces out a quantity of water equal to its own volume, and this volume is ascertained by the amount of outflow from the syphon into a graduated receiver. The precautions and detailed description of this and several other operations are here omitted.—Proc. Pa. Phar. Assoc., 1900, 136–142.

Nitrometer — Inexpensive and Simple Construction. — Arthur W. Nunn describes the nitrometer shown by Fig. 44, which is constructed with such odd pieces as usually are found in stock. The tubes *A* and *B* are ½ oz. male syringes, without the piston-rods, let through two holes in a piece of wood, and connected by eight or nine inches of feeding-bottle tubing. A good cork is fitted into *B*, bearing about an inch of feeding-bottle tubing drawn out to a fine bore at *C*, and just protruding through the cork. A full length feeding-bottle tube, *E*, is then connected by a small section of rubber tubing to *C*, and kept in position by the wire upright, *F*, while the connecting piece of rubber tube is provided with a clip, *G*, which should be carefully adjusted so as to close it perfectly when screwed up. By methods which will suggest themselves readily, the tube, *B*, is graduated into divisions of 5 minims each, or any other suitable division. *D* is an ordinary graduated pipette. The use of the apparatus is obvious.—Pharm. Journ., Fed. 23, 1901, 215.

FIG. 44.



Nitrometer.

Nitrometer—Simple Construction from a Glass Tube.—John Glassford gives the following simple directions for making a nitrometer, that answers all requirements for testing spirit of nitrous ether, from a piece of ordinary glass tube of any length over 12 inches, having at least ¼ inch bore, the other accessories being 1½ inches of rubber tube to fit the glass one, and a cork. Selecting, for example, a piece of glass tube 20 inches long, a piece three inches long is broken off after making a file scratch, and on

this three file-marks are made exactly one inch apart, the end-edges being rounded in the flame. The center mark being in the middle of the tube, as shown at R. T. (Fig. 45), there will be a half inch of glass beyond each outside mark. The rubber tube is slipped over the end of the tube up to the first mark. The cork, which should not be over ⅜ inch long and should fit tightly, is then pushed up to the middle of the rubber tube, in the open end of which the 17 inch glass tube is slipped until it almost touches the cork. This arrangement is shown at *C*, the cork serving as a pinch-cock, operated by pressing the rubber tube, whereby a slight opening is formed which communicates with the upper and lower tubes. In use the instrument is inserted in an 8 oz. porcelain dish containing 4 ozs. of brine (1 : 2.8 common salt), pressure is applied to the cork-valve, and suction applied at the upper end of the apparatus until the brine appears in the upper tube, after which the level is adjusted to the lowermost of the three graduations. The spirit to be tested is then filled in to the second mark, and allowed to flow in by pressing upon the valve—washing down the last traces with a little alcohol. Then solution of potassium iodide (1 in 6) up to the highest mark, is allowed to flow into the lower tube in the same manner, and this followed by an equal quantity of normal sulphuric acid, which is finally washed down with a little salt solution. When reaction subsides, the lower end of the long tube is closed with the forefinger, beneath the surface of the brine, the instrument removed from the stand supporting it and shaken. It is then replaced until bubbles of gas cease to rise. A little salt water is put into the graduated tube, the apparatus again removed and closed with the forefinger as before, and while the tube is held as nearly horizontal as possible without spilling the brine in the upper tube, the cork pinch-cock is opened. A little brine will enter the longer tube, which is then replaced in the stand, and when the level of the liquid is constant, its position is marked. The instrument is emptied, and the distance measured from the mark to the upper end of the longer tube where it joins the cork pinch-cock. If the spirit is of full strength (4 per cent.), this distance should be 11 inches, eleven times the volume of the spirit. It follows that $\frac{4}{11}$th of any other length of the gas column will indicate the percentage in the spirit tested.

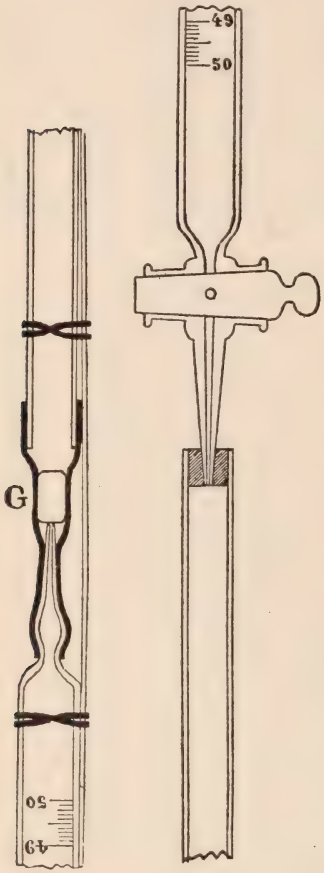
Fig. 45.

Instead of an ordinary glass tube, a plain or stoppered burette may be used in like manner. In the case of the plain burette, a glass pinch-cock is formed in the rubber tube by the insertion of a small section of glass rod with rounded end, as shown at *G* (Fig. 46). When the stoppered burette is used, the nozzle should not extend above the cork in the short upper tube, as shown by Fig. 47. The spirit in both cases must be meas-

ured, and not more than 3 Cc. should be used for a 50 Cc. burette. Some modifications in the final adjustment are also necessary.—Drugg. Circ., July, 1900, 133.

Aromatic Spirit of Ammonia, B. P.—Modification of the Barium Chloride Test for Ammonium Carbonate.—Referring to the investigation of Edmund White, by which he conclusively proved that the B. P. test for ammonium carbonate in aromatic spirit of ammonia is delusive and unreliable (see Proceedings, 1900, 513), F. E. J. Bird communicates the results of an attempt to render the barium chloride test sufficiently accurate to fulfil the purpose for which it is intended. He finds that when the solution of barium chloride is added to the spirit a precipitate falls which is of a more or less gelatinous nature, and on heating to 160° F. the aggregation of the precipitate is not very decided. If, however, varying quantities of ammonium chloride are added to the reacting solution, the barium carbonate underwent an immediate change: it lost its gelatinous character entirely, and settled at once to the bottom of the liquid as a fine white granular powder. Upon this observation the author bases the following modifications of the B. P. test: To 20 Cc. of the aromatic spirit of ammonia add 5 Gm. of ammonium chloride, agitate vigorously, and add 16 Cc. of solution of barium chloride (B. P.). Warm to 160° F., cool to the normal temperature, and filter. On addition of barium chloride to the filtrate and warming, no further precipitate is produced. A faint opalescence, at first produced, disappears on warming. With 21 Cc. of aromatic spirit a permanent precipitate will be produced in the filtrate, not redissolved on warming, and with 22 Cc this precipitate is copious.—Trans. Brit. Pharm. Conf., 1900, 430–431.

FIG. 46. FIG. 47.



Extract of Fresh Lemon and Orange Peel—Formula.—John K. Williams recommends the preparation of the extract of fresh lemon or orange peel by grating the outer rind of fifty fruits, and macerating the rind in a mixture of 8 fl. ozs. of glycerin and 64 fl. ozs. deodorized alcohol Finally filter.—West. Drugg., July, 1900, 357.

STILI.

Stili Spirituosi—Preparation and Utility.—Unna designates by the name "stili spirituosi" pencils, or rather tubes containing the so-called solidified spirit. The latter is obtained by dissolving 6 p. of sodium stearate in a mixture of 2 p. of glycerin and 100 p. of alcohol. On cooling this solidifies, and has proven an excellent disinfectant application, leaving when applied to the skin a delicate protective varnish. The pencils (tubes) are intended simply for convenience in practice.—Pharm. Ztg., May 29, 1901, 432; from D. Monatsh. f. Prakt. Derm.

SUCCI.

Fruit Juices—Experiments with Various Preservatives.—In reply to a query concerning the availability of formaldehyde, hydrogen dioxide, boric acid, and salicylic acid, as preservatives for fruit juice, John M. Wiesel communicates the results of his experiments which seem to indicate that these juices are well preserved with 2 per cent. of either boric or salicylic acid, and with as little as ½ per cent. of formaldehyde, but that even 5 per cent. of hydrogen dioxide failed to act as a preservative. The author points out that formaldehyde is generally considered non-toxic, and cites the experience of Dr. Rideal, communicated to the Society of Public Analysts, London, who stated that he had frequently drank a considerable quantity of a 1 per cent. solution of formaldehyde without experiencing any ill effects,—Proc. Md. Pharm., 1900, 114–116.

SUPPOSITORIA.

Glycerin Suppositories, U. S. P. — Improved Formula. — L. E. Sayre states that the official formula for glycerin suppositories has been, now and then, criticised unfavorably, partly on the ground of their bulk, and partly because the proportions of the ingredients are not such as to give the greatest efficiency to the preparation. He has been furnished by a Western pharmacist of note the following formula, which yields rectal suppositories yielding 4 Gm. each instead of 6.8 Gm.: Glycerin, 300 Gm.; sodium carbonate, 6 Gm.; stearic acid, 10 Gm. Mix the ingredients, and make suppositories according to the official directions. — Drugg. Circ., Jan., 1901, 6.

Suppositoria Opii et Belladonnæ—Formula of the Philadelphia Hospital. —Powdered opium, 0.065 Gm.; ext. belladonna, 0.016 Gm. For one suppository.

Suppositoria Opii et Plumbi—Formula of the Philadelphia Hospital.— Powdered opium, 0.065 Gm.; lead acetate, 0.2 Gm. For one suppository.—Amer. Jour. Pharm., Sept., 1900, 436.

Phenol Suppositories, B. P.—Modification of Formula.—Frank R. Dudderidge, who has frequently experienced difficulty in removing phenol suppositories, when made by the official formula, from the mold, tried the

addition of a larger proportion of wax, but found that this did not remedy the difficulty. In fact, he found that the addition of a large proportion of wax had the effect rather of producing this result than to obviate it, and his recorded experiments justify his conclusion that the suppositories should be made from phenol and oil of theobroma alone.—Trans. Brit. Phar. Conf., 1900, 522.

SYRUPI.

Syrups—Ultramarine in the Sugar the Most Fruitful Cause of Spoiling.—Alfred I. Cohn enumerates the causes which are prone to occasion deterioration in syrups, such as insufficiency of sugar, exposure to high temperatures or to light, presence of substances prone to ferment, or otherwise unstable, and impurities in the sugar used. With one or two exceptions these can all be practically controlled by the pharmacist, but the one cause that is most prolific in causing the spoiling of syrups is the last one named, the impurities in the sugar, and among these foremost is ultramarine blue. This, as is well understood, is employed by the sugar refiners to impart the appearance of "whiteness" to the sugar, and while the quantity introduced for this purpose is not sufficient to affect the eligibility of the sugar as a food, its presence, however small, very decidedly interferes with the stability of syrups into which it enters. The author mentions a large number of syrups which are unfavorably affected by its presence; in fact there are but few pharmacopœial syrups which do not contain one or more constituents incompatible with and fully able to decompose ultramarine blue. The general disregard to the U. S. P. demands that the sugar used for making its preparation be free from ultramarine, would appear to make it expedient, if not absolutely necessary, that a form of sugar be made official, which may always be depended upon as being absolutely free from all disturbing contamination and impurities. The sugar that will best answer all requirements, and that is within the reach of every pharmacist, is white rock candy. This, although initially more expensive, will prove more economical in the end, inasmuch as by its use the waste occasioned by spoiled material is avoided, not to speak of the time wasted in making the unsatisfactory preparation.—Amer. Journ. Pharm., Mar., 1901, 119–125.

Syrups of the British Pharmacopœia—Specific Gravities.—George F. Merson makes some practical remarks concerning some of the syrups official in the B. P., and in this connection communicates a table showing their specific gravities, which, although not absolute, may serve as a general guide in practice. The third decimal is taken in each case in multiples of 5, as being sufficiently close for ordinary purposes.

Syrupus	1.330
Syrup Aromat	1.160
" Aurantii	1.290

Syrup Aurantii Flor.	1.330
" Calc. lactophosph	1.315
" Cascar. aromat.	1.120
" Chloral	1.325
" Codeinæ	1.330
" Ferri iodid	1.385
" Glucosi	—
" Hemidesmi	1.330
" Limonis	1.290
" Pruni virg.	1.300
" Rhei	1.300
" Rhœados	1.300
" Rosæ	1.330
" Scillæ	1.335
" Senna	1.280
" Tolutanus	1.330
" Zingiberis	1.310

—Pharm. Journ., Feb. 23, 1901, 208–209.

Syrups—Formulæ of the Philadelphia Hospital.—The following formulas for syrups have been adopted in the recently revised edition of the "Pharmacopœia of the Philadelphia Hospital":

Syrupus Hypophosphitum cum Ferro: Ferrous lactate, 0.065 Gm. lactic acid, 0.12 Cc.; syrup of hypophosphites, enough to make 4.0 Cc. Dose: One or more teaspoonfuls.

Syrupus Potassii Iodidi: Potassium iodide, 0.6 Gm.; comp. syrup of sarsaparilla, enough to make 4.0 Cc. Dose: One to two teaspoonfuls.

Syrupus Potassii Iodidi Compositus: Potassium iodide, 0.6 Gm.; corrosive mercuric chloride, 0.003 Gm.; comp. syr. sarsaparilla, enough to make 4.0 Cc. Dose: One to two teaspoonfuls.

Syrupus Quininæ: Quinine hydrochloride, 0.15 Gm.; dil. hydrochloric acid, 0.075 Cc.; glycerin, 0.45 Cc.; syrup, 1.3 Cc.; chloroform water, enough to make 4.0 Cc. Dose: One to four teaspoonfuls. — Amer. Jour. Pharm., October, 1900, 504.

Syrup of Ferrous Iodide — Advantages of Glucose and of Glycerin as Preservatives. — In reply to a query concerning the advantages of glucose and of glycerin as preservatives of syrup of ferrous iodide, H. Lionel Meredith communicates the results of his studies and experiments, which have convinced him that both of these substances are excellent preservatives for the purposes mentioned. He finds that glycerin acts as a preservative by simply preventing oxidation; that it assimilates iodine, after liberation, into a non-irritating form, in which form it may be easily taken up by the system, *as iodine*, and does not act as an iron preparation; and that glycerin is not objectionable in the preparation, as it is an easily assimilated food for the organism. It is furthermore found that, in a working formula, it is best to replace one-half the syrup with glycerin, rather than to use glycerin alone. Nevertheless, the author does *not* consider the use of

glycerin at all advantageous, but finds in glucose not only a better preservative, but almost an ideal one, acting, as it does, both by preventing oxidation and reducing the iodine after liberation. In a working formula the syrup of cane-sugar is replaced by one of glucose having the sp. gr. 1.40, which must, however, be free from sulphate and chloride, in order to insure a permanent preparation. If the official ingredients are to be retained in the formula for this syrup — if it is to be made with cane-sugar syrup—the following conditions must be observed : The sugar must be pure, and free from ultramarine. The syrup must be prepared with distilled water, which must particularly be free from ammonia. The syrup must have at least the sp. gr. 1.35.—Proc. Md. Pharm. Assoc., 1900, 101–108.

Syrupus Ferri Iodidi—Advantageous Addition of Glucose.—W. Lyons calls attention to a sample of syrup of ferrous iodide prepared by him six years ago according to the official method, with the exception that 10 per cent. of the sugar was replaced by glucose. The sample has kept perfectly and is apparently as good as when made.—Pharm. Journ., Dec. 29, 1900, 754.

Syrup of Iodide of Iron—Preservation.—Debrage discusses the causes of the alteration of syrup of iodide of iron, and the remedies. The addition of a small amount of tartaric acid has been proposed for its preservation, but this only retards the change from the ferrous to the ferric condition, and does not prevent it. Solutions of ferrous salts should always be put into flasks made of white glass and kept in the light, but they should at the same time be kept full and perfectly stoppered ; a small quantity of tartaric acid may, with advantage, be added to aqueous solutions.—Chem. News, Aug. 10, 1900, 71 ; from Jour. de Pharm. et Chim., (6) xi, No. 6.

Syrup of Iodide of Iron—Causes of Discoloration.—Experiments made by F. W. Haussmann point out that the discoloration in syrup of ferrous iodide on keeping is mainly due to caramelization of the sugar ; in exceptional instances only to the oxidation of the ferrous salt. In an examination of some fifteen discolored samples not one reacted for the presence of ferric compounds. Moreover, ferrous iodide is not the only iron salt which causes darkening in syrup. A syrup of ferrous sulphate, containing 10 per cent. of the salt, prepared by dissolving the sugar in an aqueous solution and heating to boiling, turned from a light green to a brown color on standing 4 to 6 months, but at the expiration of that time gave no reaction for ferric compounds. Heat favors the change, preparations made at temperatures below the boiling possessing greater stability.—Amer. Jour. Pharm., Jan., 1901, 17–18.

Syrupus Ferri Iodidi — Method of Assay.—E. Rapp suggests a method for the assay of syrup of ferrous iodide which depends upon the liberation of iodine by potassium permanganate and subsequent estimation of the

iodine by decinormal sodium thiosulphate. Any excess of permanganate employed is destroyed by the sugar contained in the syrup. The working process is as follows: Dilute 5 Gm. of the syrup with 10 Cc. of water, add 10 Cc. of diluted sulphuric acid, and then a 1 per cent. solution of potassium permanganate, until the liquid remains purple for two or three seconds, this being best observed by rotating the liquid and looking through the thin layers on the sides of the vessel containing it. After three hours, with occasional shaking, 1 to 2 Gm. of potassium iodide is added, and, after another hour, titration is effected by means of thiosulphate solution in the usual way.—Arch. d. Pharm., vol. 238, 159.

Syrupus Ferri Phosphatis cum Quinina et Strychnina, B. P.—Impracticability of Preparing it from the Concentrated Commercial Solutions.—H. J. Henderson observes that the introduction of syrupus ferri phosphatis cum quinina et strychnina into the B. P. has created a demand for a "concentrated liquor," claimed to be four times the strength of the official syrup, and convenient for the preparation of the latter. Mr. Henderson has had occasion to prepare

Liquor Ferri Phosphatis cum Quinina et Strychnina in quantities, and after some considerable experience has no hesitation in asserting that a liquor of the strength mentioned, which when diluted shall fairly represent the syrup of the Pharmacopœia, cannot be prepared; but there is no reason why the syrup itself should not be prepared in the humblest pharmacy. The contents of the bottle either become perfectly solid or an insoluble block of alkaloids, surmounted by a red liquor, half fills the bottle, and this block is not to be dissolved by heating. Being aware that many liquors are sold which do not act in this manner, he has purchased samples from various places, and estimated the total alkaloids in them. Of 10 samples so procured, 7 were deficient in alkaloid, 5 contained less than 4 per cent., and all that contained over 4 per cent. contained chlorides. One sample contained glycerin, another alcohol. The correct quantity is 4.596 grammes of alkaloid in 100 Cc. of the liquor. Three of the samples contained 4.82, 4.84 and 4.88 grammes respectively; two of them as low as 1.25 and 1.30 grammes, the next lowest being 3.65 grammes. —Trans. Brit. Pharm. Conf., 1900, 434–437.

Syrupus Ferri Phosphatis cum Quinina et Strychnina, B. P.—Necessity to Increase the Percentage of Phosphoric Acid in Summer.—W. Lyons observes that for the colder portion of the year, the official syrup of phosphate of iron with quinine and strychnine is as satisfactory as can be expected, but it is his experience that during the summer season the percentage of phosphoric acid requires to be increased (from 6.25 per cent., Rep.) to 7.25 or 8.25 per cent. The directions for making might likewise be made more definite. "Heat gently" with some people means putting the flask in a water-bath, a plan much to be deprecated, for

although it accelerates the making of the syrup it likewise accelerates its deterioration. Summer heat is all that is required. Another point, the B. P. says: "In the resulting solution dissolve the strychnine and the quinine sulphate." This should read: "Put the quinine sulphate and strychnine in a mortar and mix them with 30 Cc. of distilled water, then add the solution of phosphate of iron." Solution is then rapid and easy, but if the quinine and strychnine are added dry to the acid solution the quinine gets into hard lumps, which are only slowly dissolved. With regard to

Syrupus Hypophosphitum Compositus, B. P. C., the author says, that while Mr. Martindale finds that the formula is unsatisfactory, and that the syrup does not keep well, with a slight modification it gives a syrup that is all that can be desired. If, instead of using two drachms of hypophosphorous acid to each pint as the B. P. C. formula directs, that quantity is reduced to half a drachm, and ten grains (to the pint) of citric acid added when the salts have been dissolved, the result is a fine, bright syrup which keeps well.—Pharm. Journ., Jan. 12, 1901, 29.

Syrup of Hypophosphites, Compound, N. F.—Inert Character of the Precipitate. — Ferdinand A. Sieker has examined the precipitate which forms in the compound syrup of hypophosphites, N. F., on standing. He finds it to be crystalline, composed exclusively of calcium citrate, and consequently inert. It is stated in the second (revised) edition of the N. F. that this syrup "is not intended to be perfectly clear, and should be shaken before using." Mr. Sieker, however, finds that when shaken the precipitate separates from the bottle in scales, which cannot be properly incorporated; and, being inert, it should be removed by decantation or straining.—Pharm. Rev., Sept., 1900, 410.

Syrupus Kolæ Compositus, (Clear)—Formula. — Dr. J. Flesh recommends a compound syrup of kola for the treatment of functional nervous disorders, which is prepared according to the following formula: Iron and quinine citrate, 2.5 Gm.; strychnine nitrate, 0.075 Gm.; fluid extract of kola, 25.0 Gm.; sodium glycerophosphate, 25.0 Gm., which dissolve in syrup of orange, 200 Gm. The dose is a teaspoonful three times daily, after meals, each teaspoonful containing 0.0015 strychnine, 0.05 iron and quinine, 0.5 fl. ext. kola, and 0.5 glycerophosphate. — Pharm. Ztg., Nov. 28, 1900, 919; from Wien. Klin. Rdsch., 1900, No. 43.

Syrup of White Pine, Compound—Formula. – B. S. Cooban finds the following a good formula for syrup of white pine compound:

White pine bark	1¼ pounds.
Wild cherry bark	1¼ pounds.
Bloodroot	3 ounces.
Balm of Gilead buds	3 ounces.
Spikenard	3 ounces.
Sassafras	1½ ounces.

Sugar	12 pounds.
Morphine sulphate	64 grains.
Chloroform (Squibb's)	2 ounces.
Alcohol and water	sufficient.

Reduce the drugs to about a No. 30 powder; moisten with a menstruum composed of one part of alcohol and two of water; then pack in a percolator and pour on the menstruum until one gallon of percolate is obtained. In the percolate dissolve the sugar, morphine, and chloroform, and add sufficient menstruum to make the finished product measure 2¼ gallons. Color with caramel.—Bull. Pharm., Feb., 1901, 62.

Aromatic Syrup of Yerba Santa—Improved Formula.—John H. Haydon, Jr., recommends the following improved formula for aromatic syrup of yerba santa, for which the *leaves* of yerba santa only should be used in order to secure the true flavor of the drug:

Yerba santa leaves, Cinnamon bark	of each ozs. 8
Cloves	oz. ½
Cardamom seed	drs. 2
Sweet orange peel (fresh)	oz. 1
Coriander seed, Caraway seed, Anise seed, Cochineal (powd.), Potassium bicarbonate	of each dr. 1
Glycerin	fl, ozs. 8
Sugar	lbs. 3½
Water	sufficient to make pints 4.

Mix the drugs and reduce to a coarse powder. Mix the glycerin with 8 fluid ounces of water and with this moisten the drugs, macerating for twenty-four hours. Add the potassium bicarbonate, previously dissolved in 8 fluid ounces of water, and pack lightly in a percolator. Percolate with water until two pints are obtained; in this dissolve the sugar with a gentle heat and strain, adding sufficient water through the percolator to make up the volume to four pints.—Amer. Drugg., Nov. 26, 1900, 307.

TINCTURÆ.

Tinctures of the B. P.—Specific Gravity and Residue of Evaporation.—In response to a general invitation by circular of the Irish Pharmaceutical Society, J. C. McWalter determined the specific gravity of the tinctures of the B. P., and the weight of the residue after evaporating an ounce of the tincture to dryness, and communicated his results in a paper read before the British Pharmaceutical Conference. These show that the weight of the residue in these tinctures is subject to greater variations than the specific gravity. Whilst 0.010 would cover the differences in the latter, in

most cases the variations of the weight of residue are as much as 50 per cent. If, therefore, the compilers of the new B. P. intend to publish standards for residue, they will need to allow a very great limit—so much so as to be of little use.—Proc. Brit. Pharm. Conf., 1900.

Referring to the foregoing paper of Mr. McWalter, F. M. Alcock observes that the figures obtained by evaporating the tinctures to dryness would have been more valuable if the amount of ash contained in the dry extracts had also been given. This phase of the question suggested itself whilst the author made some experiments with official infusions. Thus in the case of infusion of buchu, 3 fluid ounces yielded 0.306 Gm. (= 4.73 grains) of residue of evaporation, and this, when ignited, yielded 0.083 Gm. (= 1.28 grains of ash.—Pharm. Journ., Aug. 25, 1900, 238.

The B. P. Tinctures—Specific Gravities and Residues of Evaporation.—A controversy has arisen respecting the specific gravities of the tinctures of the B. P., 1898, in consequence of which quite a number of papers giving the experience and results of experiments made in this connection. In the "Chem. & Drugg.," July 7, 1900 (12 to 15), three papers appear on this subject. The first is by F. W. Fletcher, who gives a comprehensive table exhibiting the information concerning all of the B. P. tinctures, the menstrua employed in their preparation, the specific gravities of each, the alcoholic strength of each—referred both to absolute alcohol and to proof spirit—and the percentages of residue of evaporation. This author prefers the process of simple percolation, *i. e.*, dampening of the powder with about one half its weight of menstruum and then packing into a percolator and percolating—to, what he calls, the "bastard percolation-process" of the Pharmacopœia.

The second paper is by H. B. Holthouse and T. F. Harvey, who give the average limits of sp. gr. of the B. P. tinctures as ascertained from four to ten samples of each tincture—less in a few and more in three instances—and exhibit them in a tabulated statement showing also the limits obtained by Barclay, Umney and Pearmain, Morse, Lucas, and Gadd.

The third paper is by C. G. Morse and M. Priest, who call attention to the importance of making the various determinations not alone with care, but under uniform conditions. The total solids may be estimated conveniently by drying in platinum to constant weight; the alcohol, by diluting 25 Cc. with about 60 Cc. of water, and distilling off 50 Cc.; the specific gravity, either by the use of the bottle or the Westphal balance, both to be preliminarily tested for accuracy. These authors are engaged in a work on "standards" in which their results will be given in detail. In the present paper they give what they regard as representing the general average figure to which the B. P. figure should conform, as shown below. The solids are in grammes per 100 Cc.; the alcohol as absolute alcohol by volume:

Tr. Aconiti.—Sp. Gr. at 15.5° C., 0.900; Total Solids per cent. 1.2–1.8; Alcohol per cent., 67.

Tr. Aloes.—S. G., 0.979; T. S., 6.5–8.0; A., 39.

Tr. Arnicæ.—S. G., 0.892; T. S., 0.55; A., 68.

Tr. Asafetidæ.—S. G., 0.910; A., 65.

Ten grammes per 100 Cc. was the residue in the case of tinctures specially made by us. The majority of commercial tinctures are made from asafetida containing stones, and have solids varying from 3 to 8 per cent.

Tr. Aurantii.—S. G., 0.880; T. S., 1.8–2.0; A., 74.

This tincture is directed only to be made from fresh peel now.

Tr. Belladonnæ.—S. G., 0.912–0.918; T. S., 0.6–2.0; A., 58.5.

The extractive matter in this tincture varies much, but, as it is standardized to a given amount of alkaloid, the extractive is of little consequence.

Tr. Benzoin. Co.—S. G., 0.890–0.900; T. S., 18; A., 76.

Low solids may be due to the use of benzoin containing much woody matter.

Tr. Buchu.—S. G., 0.932; T. S., 3.9; A., 37.

Tr. Calumbæ.—S. G., 0.917; T. S., 1.1; A., 59.

Tr. Camph Co.—S. G., 0.917; T. S., 0.2–0.3; A., 58.

The varying solids in the tr. opii will influence the solids in this tincture, and care must be taken to drive off all the camphor.

Tr. Cannabis Indicæ.—S. G., 0.846; T. S., 4.0; A., 86.

Tr. Cantharidis.—S. G., 0.835; T. S., 0.15–0.25; A., 89.

Tr. Card. Co.—S. G., 0.948; T. S., 6.5; A., 56.

The color of this tincture varies considerably, and this is probably due to the cochineal containing high ash. The solids are also more variable in some tinctures (sold as "B. P.") than seems consistent with following out the directions. For instance, we have one as low as 3.5, and another as high as 8.1.

Tr. Capsici.—S. G., 0.894; T. S., 0.7–1.5; A., 69.

These variations in solids, though remarkable, may occur in properly prepared samples.

Tr. Cascarillæ.—S. G., 0.899; A., 68.

Tr. Catechu.—S. G., 0.979; T. S., 15.0; A., 52.

Tr. Chirettæ.—S. G., 0.926; T. S., 1.4; A., 58.

Tr. Chlorof. et Morph.—S. G., 1.011; T. S., 28.0; A., 52.

Tr. Cimicifugæ.—S. G., 0.928; T. S., 1.5–2.5; A. 58.

Tr. Cinchonæ.—S. G., 0.917; T. S., 4.0–7.0; A., 64.

Tr. Cinchonæ Co.—S. G., 0.914: T. S., 4.0–6.0; A., 65.0.

Tr. Cinnamomi.—S. G., 0.902; T. S., 2.5; A., 68.0.

Tr. Cocci.—S. G., 0.952; T. S., 2.0–3.0; A., 45.0.

Tr. Colchici Sem.—S. G., 0.953; A., 43.0.

Tr. Conii.—S. G., 0.896; A., 69.0.

Tr. Croci.—S. G., 0.925; T. S., 2.5.

Tr. Cubebæ.—S. G., 0.845; A., 85.0.

Tr. Digitalis.—S. G., 0.929 ; T. S., 3.5 ; A. 57.0.

Tr. Ergot. Amm.—S. G., 0.937 ; T. S., 4.0 ; A., 51.0.

Tr. Ferri Perchlor.—S. G., 1.086 ; A. 22.0.

The authors have found the solids in commercial samples of this tincture very variable, namely, from 10 to 15 grammes per 100 Cc.

Tr. Gelsemii.—S. G., 0.918 ; T. S., 0.9–2.0 ; A., 58.0.

Tr. Gentianæ.—S. G., 0.965 ; T. S., 5.2 ; A., 44.0.

Tr. Guiaici Amm.—S. G., 0.899 ; T. S., 16.0 ; A., 72.0.

Tr. Hamamelis.—S. G., 0.950 ; T. S., 2.0 ; A., 43.

Tr. Hydrastis.—S. G., 0.924 ; T. S., 2.3 ; A., 58.

Tr. Hyoscyami.—S. G., 0.955 ; T. S., 2.8 ; A., 45.

The authors have found the solids in this tincture, sold as B. P., to vary from 1.6 to 3.4.

Tr. Iodi.—S. G., 0.878 ; A., 86.

Tr. Jaborandi.—S. G., 0.953 ; T. S., 3.0 ; A., 43.

Tr. Jalapæ.—S. G., 0.995 ; A., 68.

Tr. Kino.—S. G., 0.999 ; A., 50.

Tr. Krameriæ.—S. G., 0.936 : T. S., 4.5 ; A., 56.

Tr. Lavand. Co.—S. G., 0.838 ; T. S., 0.4–0.7 ; A., 88.0.

Tr. Limonis.—S. G., 0.879 ; T. S., 1.5 : A., 75.

Tr. Lobelia Aeth.—S. G., 0.818 ; T. S., 1.1–2.0 ; A., 64.

Tr. Lupuli.—S. G., 0.932 ; T. S., 3.8–4.4 ; A., 56.

Tr. Myrrhæ.—S. G., 0.852 ; T. S., 6.0 ; A., 85.

Some tinctures sold as B. P. gave solids of only 3 grammes per 100 Cc.

Tr. Nucis Vom.—S. G , 0.912 ; T. S., 1.1–2.2 ; A., 65.

Both solids and spirit are naturally variable in this tincture.

Tr. Opii.—S. G., 0.956 ; T. S., 3.2–5.8 : A., 45.

The sp. gr. of this tincture may vary, as the solids vary considerably.

Tr. Opii Amm.—S. G., 0.896 ; A., 66.

Tr. Podophylli.—S. G., 0.844 ; T. S., 3.3 ; A., 87.

Tr. Pruni Virg.—S. G., 0.935 ; T. S., 3.2 ; A., 54.0.

Tr. Pyrethri.—S. G., 0.897 ; A., 68.

Tr. Quassiæ.—S. G., 0.945 ; T. S., .26–.54 ; A., 45.

Tr. Quillaiæ.—S. G., 0.918 ; T. S., 1.2 ; A., 58.

Tr. Quininæ.—A., 74.

Tr. Quininæ Amm.—S. G., 0.926 ; T. S., 1.8 ; A., 53.

Tr. Rhei Co.—S. G., 0.972 ; T. S., 16.0 ; A., 52.

Tr. Scillæ.—S. G., 0.968 ; T. S., 11.0 ; A., 53.

Tr. Senegæ.—S. G., 0.938 ; T. S., 4.5 ; A., 57.

Tr. Sennæ Co.—S. G., 0.998 ; T. S., 10.0 ; A., 38.5.

Tr. Serpentariæ.—S. G., 0.896 ; A., 68.

Tr. Stramonii.—S. G., 0.960 ; T. S., 3.8 ; A., 43.

Tr. Strophanthi.—S. G., 0.890 ; T. S., .35–.75 ; A., .69.

Tr. Sumbul.—S. G., 0.895 ; T. S., 2.4 ; A., 68.

Tr. Tolutana.—S. G., 0.865 ; T. S., 8.5 ; A., 81.

Tr. Valerianæ Amm.—S. G., 0.938 ; T. S., 3.5 ; A., 53.

The authors conclude that any B. P. tincture found to vary very much from the figures given in the above, needs special attention.

Compound Tinctures—Preparation by Admixture of Simple Tinctures.—F. H. Alcock suggests that the compound tinctures of the B. P. might advantageously be prepared by the admixture of simple tinctures in suitable proportions, and selects compound tincture of cinchona as an example to point out the feasibility. Using simple tinctures which are now official, the formula for this compound tincture would read as follows : Tincture of orange peel, 4 fl. ozs. ; tincture of serpentaria, 2.5 fl. ozs. ; tincture of cochineal, 5 fl. dr. ; tincture of saffron, 2.5 fl. ozs. ; tincture of cinchona, 10 fl. ozs. These proportions make 3 fl. drachms less than 1 pint (Imp. measure) which might be made up by increasing the tincture of cochineal to 1 fl. oz. The resultant fluid represents the officially prescribed tincture very satisfactorily, and the method might be applied equally so in the instances of other compound tinctures.—Pharm. Jour., Oct. 13, 1900, 415.

Tinctura Digitalis (Fat-free, J. W. E.)—*Formula of the Philadelphia Hospital.*—Powdered digitalis (fat-free), 0.55 Gm. ; ammonia water, sufficient ; diluted alcohol, enough to measure 4.0 Cc. Dose : 10 to 30 minims.

This tincture is made by the method proposed by Mr. Joseph W. England (see Proceedings, 1900, 530), from digitalis leaves deprived of fat by exhaustion with petroleum benzin.

Tinctura Piperis Nigri—Formula of the Philadelphia Hospital.—Powd. black pepper, 0.25 Gm. ; alcohol, enough to make 4.0 Cc. Dose : 10 to 60 minims.—Amer. Journ. Pharm.

Essence of Ginger—Examination of a Dangerous Preparation Containing Methyl Alcohol.—H. P. Hynson and H. A. Brown Dunning report the result of an examination of essence of Jamaica ginger supplied to them by Dr. Herbert Harlan as being a portion of the same lot as that which had produced blindness when drunk by a man in Crisfield, Md. (see *Methyl Alcohol*, under "Organic Chemistry.") These results show very conclusively that the essence under examination contained a large percentage of wood alcohol—apparently 75 per cent.—and a smaller one—25 per cent. calculated on the total distillate—of ethyl alcohol. Moreover, the residue in the retort differed very decidedly from that left by officially-prepared essence of Jamaica ginger, and evidently contained large quantities of capsicum to make it "hot," and to compensate for any deficiency in ginger. The authors also received from Dr. Harlan a sample of

Essence of Peppermint, which had produced partial blindness in another case ; but the quantity received was insufficient for a complete examination. It however showed the same taint as the essence of ginger,

differing from the latter in containing a large amount of water—about 33 per cent.—Pharm. Rev., Feb., 1901, 54–56.

Tinctura Ipecacuanhæ—Cause of Deposit in the Preparation of the Codex.—Dubière states that the well-known formation of a deposit in tincture of ipecacuanha is due to the use of diluted alcohol for its preparation. If the tincture is prepared with 80 per cent. alcohol, it will remain perfectly clear, and contains the same quantity of emetine as does the tincture made with the official menstruum. The turbidity and consequent deposit appear to be due to inulin.—Pharm, Centralh., Oct. 18, 1900, 643; from Journ. de Pharm., 1900, 345.

Tincture of Opium—Improved Formula.—F. G. Butler considers the addition of alcohol to the mixture of opium, calcium phosphate and water, before percolation, not only unnecessary but a disadvantage, since it dissolves all the narcotine, the inert resinous matter and the coloring matter. He therefore recommends the following formula and manipulation:

Assayed granulated opium	100 Gm.
Cold water	500 Cc.
Alcohol	500 Cc.

Macerate the opium for twenty-four hours with 400 Cc. water; transfer this to a percolator and allow percolation to proceed slowly, adding sufficient water to make the finished percolate measure 500 Cc. To this percolate add the 500 Cc. of alcohol and mix the whole.

A tincture made in this way will be light-colored, inodorous, palatable, and of the same strength as the present tincture; and, moreover, it will not produce the depressing and nauseating effect characteristic of the present tincture.—Bull. Pharm., Nov., 1900, 460.

Tinctura Opii Deodorati—Improved Process of Preparation.—Frederick T. Gordon recommends an improved process for preparing deodorized tincture of opium in which he proposes paraffin in place of ether for deodorizing the aqueous extract of opium. The opium, in a granulated condition, is extracted with water practically as directed by the Pharmacopœia. The first 300 Cc. of percolate from 100 Gm. of drug are received, the subsequent portions are evaporated to 200 Cc., and the two portions, being mixed, are heated to 180° F. Then 150 Gm. of paraffin U. S. P. are added, and when this has melted the mixture is shaken thoroughly for five or ten minutes and set aside to cool. When the paraffin has hardened, the crust is broken and the aqueous opium solution poured out, the under side of the paraffin crusts being washed with a little water and the washings added to the decanted liquid, which is brought to 800 Cc. To this, 200 Cc. of alcohol are added and finally enough water to make 1000 Cc. of finished product. The author has convinced himself experimentally that the paraffin removes the narcotine and odorous matter, but none of

the morphine—the latter existing in the opium, as is well known, as meconate, and this is insoluble in the melted paraffin.—Amer. Jour. Pharm., Dec., 1900, 576–580.

Warburg's Tincture—Working Process Based on the Original Formula.—John Glassford criticises the different formulas for Warburg's tincture that have been published since the original one was published. Concerning the formula for this tincture in the "National Formulary," the author observes that the omission of the chalk and confection of demokratis is proper, but that it is 15 per cent. weaker in aromatics, 4.7 per cent. weaker in quinine, and that the diluted alcohol directed contains only 48.6 per cent. of absolute alcohol, while proof spirit, directed in the original formula, contains 57 per cent., the latter formula also requiring 126.12 Gm. of aloes instead of 87.5 Gm. of extract of aloes directed in the N. F. He recommends the following as a complete formula in which, omitting the chalk and confection, he adheres closely to the original formula of Dr. Warburg as given in the 18th edition of the U. S. Dispensatory, p. 1828:

Rhubarb	42 grams.
Angelica seed	42 grams.
Elecampane	21 grams.
Saffron	21 grams.
Fennel	21 grams.
Gentian	10 grams.
Zedoary root	10 grams.
Cubeb	10 grams.
Myrrh	10 grams.
White agaric	10 grams.
Camphor	10 grams.
Quinine sulphate	105 grams.
Socotrine aloes	125 grams.
Alcohol,	
Water, of each sufficient quantity to make	5000 Cc.

Reduce the fibrous vegetable drugs to a moderately coarse (No. 40) powder, mix this with the myrrh and camphor, previously powdered, and macerate the whole during twelve hours, stirring occasionally, in a suitable, well-covered vessel, with 2700 Cc. of alcohol. To 1800 Cc. of water heated to boiling, add the aloes, previously reduced to a fine powder. When thoroughly disintegrated pour the mixture into the vessel containing the alcohol and fibrous drugs. Cover closely and allow to macerate during one week, stirring frequently, filter and pass enough alcohol and water, mixed in the proportion of three volumes of alcohol to two volumes of water, to make the filtrate measure 5000 Cc. In 1250 Cc. of the filtrate dissolve the quinine sulphate with the aid of a gentle heat (58° C.), mix this with the main portion of the filtrate, allow to stand forty-eight hours or until clear, then decant or filter. If "Warburg's Tincture Without

Aloes" is to be prepared, proceed as above, omitting the aloes. Allow the tincture to stand three days and filter through paper upon the surface of which purified talcum powder has been well rubbed. After three weeks the tincture will again have become slightly clouded, when, if it be re-filtered by the same method, it will remain remarkably clear.—Drugg. Cir., April, 1901, 71.

Warburg's Tincture—Corrected Working Formula.—Ferd. A. Sieker points out several discrepancies between the original formula for Warburg's tincture as published by Dr. Maclean in 1875 at Dr. Warburg's request, and the working formula given in the National Formulary. In the latter, the now obsolete confection of demokratis and the prepared chalk are omitted, diluted alcohol (41 per cent. absol. alcohol) is directed in place of the proof spirit (49½ per cent. absol. alcohol) of the original formula; and there is a discrepancy also in the amount of aloes, the first edition of the National Formulary directing that 28 grains of extract of aloes be dissolved in 1 pint of the tincture prepared without aloes, whilst in the revised edition 17.5 Gm. of the extract are to be used for 1000 Cc. of the tincture. On the other hand, the formula as originally published leaves a doubt as to the final quantity to be produced, and as to what is meant by the "quinia" to be added to finish the tincture, though it is assumed that the "sulphate" is intended.

Reviewing the original formula, Mr. Sieker finds that the conf. demokratis may probably be safely omitted. The chalk, however, should be added, since it can do no harm and possibly serves its reputed function of correcting the otherwise extremely acrid taste of the preparation. The menstruum should, however, at least correspond in strength to that of proof spirit, but simple maceration in a cool place for several weeks is preferred to digestion on a water-bath during 12 hours. He has for several years prepared the tincture on these lines and gives the following formula and directions which have yielded uniformly satisfactory results:

Socotrine aloes, 263 Gm.; Angelica seed (freshly ground or crushed), 85 Gm.; Rhubarb (ground), 85 Gm.; Elecampane (ground), 42.5 Gm.; Crocus (entire), 42.5 Gm.; Fennel (freshly ground), 42.5 Gm.; Prepared chalk, Gentian (ground), Zedoary (ground), Cubebs (freshly ground), Myrrh (freshly crushed), Camphor, Agaric (powdered), of each 21.25 Gm. Macerate these ingredients for from one to two weeks or longer in a cool place (15° to 20° C.), with occasional agitation, with 9000 Cc. of a mixture of 6 vols. of alcohol and 4 vols. of water. Decant the clear liquid, forcibly express the residue, break this up, wash it with about 1000 Cc. of menstruum, again express forcibly and unite the several liquids, filtering the portions that are not perfectly clear. Then, having ascertained the total volume of liquid, calculate how much water and alcohol in the proportion of 4 to 6 vols. respectively are required to make the total volume to 10,000 Cc. In the quantity of water so ascertained dis-

solve 200 Gm. of quinine sulphate by the aid of 22 Gm. of sulphuric acid, U. S. P., add this solution to the tincture, and then enough alcohol to bring the final volume to 10,000 Cc.

A one-year-old sample made in this way was recently examined. It was perfectly clear but for a slight amount of sediment. The sp. gr. was 0.943 at 15° C. On evaporating 10 Cc. to dryness, 0.49 Gm. of brittle extract was obtained.—Amer. Jour. Pharm., Dec., 1900, 571–575.

In a note on the same subject, Mr. Sieker calls attention to an error in the revised edition of the National Formulary, which states that the finished Warburg's tincture contains 10 grains of quinine sulphate in 1 fluid ounce. By calculation he shows that the exact amount is 9.131 grains in a fluid ounce, and that in his above-given formula the quantity of quinine sulphate must therefore be increased to 219 Gm., and the sulphuric acid to 24 Gm., in order to make a preparation containing 10 grains in 1 fluid ounce.—Ibid., Jan., 1901, 30.

Referring to Mr. Sieker's article on Warburg's tincture, Mr. Wm. Martindale calls attention to the imperfection in the formula of the N. F. in that the "confectio demokratis" and the "prepared chalk" are omitted. There is a reason for the addition of chalk to the ingredients, since it is claimed that it corrects the otherwise extremely acrid taste of the tincture, and, although the amount of opium that is introduced by the addition of the "confectio demokratis" (in Dr. Warburg's practice probably substituted by its successor "confectio opii," B. P.), it seems to him desirable that the original formula should be followed as closely as possible; for, while he cannot say what the merits of the preparation are due to besides the quinine, he has known cases in which it produced a marvelous effect, far beyond that of an equivalent dose of quinine. The dose is 1 to 4 drachms, but in India it is given more heroically, the method of administration being quoted by Mr. Martindale as originally communicated by Professor Maclean. In view of these criticisms and for the purpose of comparison with Mr. Sieker's proposed formula and the formula of the revised edition of the N. F., the following formula by Mr. Martindale may find place here as given:

Tinctura Anti-Periodica—Warburg Tincture—

Socotrine aloes, bruised	240	grains.
Rhubarb, bruised	80	grains.
Angelica fruit, bruised	80	grains.
Elecampane root, bruised	40	grains.
Saffron	40	grains.
Fennel, bruised	40	grains.
Prepared chalk	40	grains.
Gentian, bruised	20	grains.
Zedoary root, bruised	20	grains.
Cubebs, bruised	20	grains.
Myrrh, elect and bruised	20	grains.
White agaric,	20	grains.

Opium, in powder	2½ grains.
Black pepper, bruised	4 grains.
Cinnamon, bruised	8 grains.
Ginger, bruised	8 grains.

Proof spirit (specific gravity, 0.920) 1 pint (20 ounces), or q. s.

Macerate for seven days, press and strain.

Dissolve in the product:

Quinine sulphate	175 grains.
Camphor	20 grains.

After three days filter, and add sufficient proof spirit to make one pint (Imp. meas. Rep.)

—Ibid., Feb., 1901, 93–95.

TROCHISCI.

Medicated Troches—Rational Composition.—Dr. William T. Cathell discusses the rational composition of medicated troches from a therapeutic aspect. While, of course, a thousand and one combinations could be made, for every-day cases the author has devised the following varieties and finds them to admirably cover the ground in ordinary practice:

MUCO–STIMULANT.

Apomorphine	1–20 grains.
Ext. eucalyptus	1–8 grains.

MUCO–SEDATIVE.

Ext. pulsatilla	1–12 grains.
Ergotin	1–16 grains.
Codeine sulphate	1–24 grains.
Ext. belladonna	1–48 grains.

MUCO–TONIC.

Potassium chlorate	1 grain.
Oleoresin cubeb	1–3 grains.
Ipecac	1–3 grains.
Catechu	1–3 grains.
Bals. tolu	2–3 grains.
Capsicum	1–50 grains.

Their respective terminations of name serve to indicate their therapeutic uses, saving the necessity of memorizing endless varieties of formulas and indications. In practice there are combined with some an unobjectionable excipient selected for its elegance and palatability (such as black-currant jelly.—Ed. W. D.). When either of these is used in the treatment of oral, faucial or pharyngeal affections chiefly for its local effect, it not infrequently plays an exceedingly useful role, either alone or as an adjuvant to other treatment.—Western Drugg., Nov., 1900, 615; from Maryland Med. Journ.

UNGUENTA.

Ointments—Classification in Accordance with Therapeutic Use.—In the course of his duties as a member of the Committee of Revision of the

United States Pharmacopœia, C. S. N. Hallberg has made a very thorough study of the ointments. In previous revisions comparatively few changes in the character of the vehicle have been made, and these appear to have been chosen solely for pharmaceutical reasons, without any discrimination as to the general therapeutic purposes. Considered from the general therapeutic standpoint, which is necessarily more or less empiric, the ointments may be divided into three groups:

1. *Protective: Non-absorbent or Epidermatic.*—There are comparatively few conditions in treatment of the skin where a purely external contact may be desired, but for such a non-absorbable vehicle is indicated. The paraffins in their different forms of consistence, such as the three official petrolatums, afford the best vehicle for such applications, which may include: (1) protectives, (2) antiseptics, (3) astringents, (4) counter-irritants, (5) germicides, and (6) parasiticides.

Emollient—Nutritive, Absorbent or Endermatic.—This class comprises by far the greatest number of indications for the use of ointments, and also the greatest range of absorbent qualities of the many fatty substances used as vehicles. Lard, sometimes with an addition of wax and oil, and, in the case of alkaloids, the use of oleic acid, affords vehicles with a range of melting points well adapted to the pharmaceutical requirements of the different medicinal agents for incorporation. These also furnish variations in consistence required for the particular ointment as desired for the purposes of inunction, or for mere protective effect, as indicated in the cerates, by increasing the proportion of the wax. There is but little doubt that fresh, pure lard is the ideal vehicle for endermatic medication, but the commercial article, often an emulsion-like mixture of lard, tallow, cottonseed oil, borax and water, is unfit for use. Carefully rendered lard, benzoinated according to the official process, when properly preserved in a cool place, resists decomposition for a long time, and answers admirably for the extemporaneous preparation of many ointments. But it is easily affected by chemical reagents, such as it may be desired to use in ointment-form. Theobroma oil (cacao oil) affords one of the most elegant ointment vehicles of this class, having an agreeable odor, and not prone to rancidity. As a nutrient, cod-liver oil is the most effective applied by inunction. These fats, therefore, are indicated for vehicles in ointments intended for the following general therapeutic purposes: emollient (also protective), anodyne, alterative, local irritant, resolvent, sedative and stimulant.

3. *Constitutional, Systemic: Absorptive or Diadermatic.*—The ointments of this class comprise only such medicinal agents as are intended for systemic or constitutional effects. The vehicle must, therefore, be such as not only to penetrate but to pass through the skin. Purified and hydrated wool-fat (adeps lanae hydrosus, U. S. P., or lanolin) possesses this prop-

erty to a high degree, because, it is supposed, of its power to absorb more than its weight of water and also beeause it is not a true fat but a chloresterin analogous to the sebaceous secretion. It has also the great advantage of being practically unalterable, never becoming rancid, and when pure, not affected by medicinal agents. Experiments reported by Unna, Shoemaker, Kiernan and others have demonstrated its great absorptive power, ointments of narcotic extracts with wool-fat vehicle being effective in twice the dose given by mouth; quinine, potassium iodide and mercury produced the constitutional effects and were found in the urine shortly after inunction with ointments of these agents and wool-fats. Its miscibility with water makes it a valuable pharmaceutical agent (excipient) for the incorporation of watery liquids with lard and oils. It is said to be especially useful in applications to the orifices of the body in genito-urinary practice, etc. It is often mixed with oil, wax, and especially theobroma oil (cacao butter), and Helbing uses the following mixtures, the addition of paraffin and wax reducing its absorptive power to nearly that of lard: Lanolin, 65; paraffin, 30; ceresin, 5 parts. Such mixtures are largely used as substitutes for lard or oils, owing to their freedom from rancidity and in not being affected by chemical agents, yet possessing the same rate of obsorption as the animal and vegetable fats and oils. Care must be used, however, in not employing lanolin as a vehicle undiluted when the systemic effect may not be desired, as, in fact, it may prove dangerous, as in the case of belladonna and mercury. The author concludes his paper by a review of the 44 ointments of the B. P., which he regards as being a great advance over the ointments contained in any and all other pharmacopœias.—West. Drugg., Dec., 1900, 652–653.

Ointments of the British Pharmacopœia, 1898—Composition.—John F. Catford has drawn up the following tabulated list of B. P. ointments, showing their composition, which may be conveniently referred to here:

Unguentum.	Medium.	Additions.	Percentage.
Hyd. Nit. Dil.	Paraffin. Molle	....	20 (fort
" Oxid. Flav.	" "	....	2
Zinc. Oleat.	" "	Sapo Dur.	50
Creosoti	" "	Paraf. Dur.	10
Eucalypt.	" "	" "	"
Paraffin	"	" "	—
Acid. Boric	Unguent.	....	"
" Salicylic	" "	....	2
Glycer. Pb. Subac.	" "	....	17
Hydr. Ammon.	" "	....	10
" Oxid. Rubr.	" "	....	"
Iodoformi	" "	....	"
Plumbi Acet.	" "	....	4
" Carb.	" "	....	10
" Iodid.	" "	....	"
Acid. Carbolic.	" "	Glycerin	4
Conii (Succus)	Adeps Lanæ Hydr.	....	200
Hamamelid	" "	....	10
Bellad.	" Benzoat	....	0.6 (alk.
Cantharid	" "	....	10
Chrysarobin	" "	...	4
Gallæ	" "	....	20
" *c*, Opio	" "	...	7.5
Hydr. Iod. Rubr.	" "	....	4
" Oleat.	" "	....	25
" Subchlor.	" "	....	10
Potas. Iodid.	" "	K_2CO_3Aq.	"
Sulphuris	" "	....	"
" Iodid.	" "	Glycerin	4
Zinci	" "	....	15
Staphisagriæ	" "	Cera flav.	20
Aconitinæ	" Ac. Oleic	....	2
Atropinæ	" " "	....	"
Cocainæ	" " "	....	
Iodi	"	Glycerin and KI	"
Veratrinæ	" " "	....	2
Hydrargyri	" Sevum	....	50
" Nitrat.	" Ol. Olivæ	....	8
Resinæ	" " "	Cera flav.	25
Hydrarg. comp.	Camphor " "	" "	20 Hg.
Picis liq.	....	" "	70
Capsici	.... " "	Cetaceum	24
Aquæ Rosæ	.... " Amygd.	Cetaceum Ol. Rosæ Cera alb.	36
Cetacei	.... " "	Cetaceum Benzoin Cera alb.	20

—Pharm. Journ., Jan. 19, 1901, 65.

B. P. Ointments—Manipulation, &c.—In response to Dr. Attfield's request that pharmacists might make known their experiences as to the stirring or non-stirring of certain B. P. ointments, W. Lyons states that after carefully trying both methods he has come to the conclusion that, for retail pharmacy, stirring is preferable. Wholesale manufacturers will doubtless, for time-saving reasons, prefer the other method, but if the

stirring is carefully done and the temperature allowed to fall gradually, the result is practically better.—Pharm. Journ., Dec. 29, 1900, 754.

Arthur W. Nunn makes some observations in the same direction, referring particularly to paraffin, resin, and spermaceti ointments. *Resin ointment* should be stirred until cold, whilst *spermaceti ointment* is better left to set after the ingredients have been melted together and strained. *Paraffin ointment* should be made by melting the hard paraffin at the lowest possible temperature, then stirring in the soft paraffin and allowing it to stand until it has set. This does not, however, finish it. When quite cold, it is rendered uniform and smooth as follows: Procure a brass wire sieve of a fine mesh (about twenty meshes to the inch), or a piece of clean wire gauze, somewhat coarser than that which is generally used under flasks when applying heat, place it over the ointment pot and rub the ointment through with a spatula, a method which does not occupy nearly so much time as rubbing the ointment down on a slab or in a mortar, or stirring until cold.—*Ibid.*, 754.

Benzoinated Lard—Simple Precautions to Obtain a Satisfactory Preparation.—Having experienced considerable trouble with benzoinated lard made from commercial lard, Melvin W. Bamford procured some pure leaf lard—the leaf fat as it is obtained from the hog—and prepared a quantity of lard by the process recommended by Professor Redwood, and adopted by the B. P. This process simply consists in removing as much of the membrane and tissue as possible from the fat, and then heating this at a temperature not exceeding 150° F., the lard so separated being strained through flannel. Such lard has the advantage of containing absolutely no water, none being used in rendering it, and when benzoinated by the U. S. P. process yields a perfectly sweet and smooth product, equal in every respect to the best products supplied by manufacturers and at about one-half the cost.—Amer. Journ. Pharm., Jan., 1901, 29.

Cold Cream—A New Formula.—Wm. C. Alpers recommends a new formula for cold cream in which almond oil is replaced by the so-called paraffin oil, also sold under the name of mineral oil or white oil. Care must be taken to select the best quality, entirely free from odor or color. The resultant cold cream is uniform in all climates and available under all conditions. White wax, 150 p., is dissolved in paraffin oil, 600 p., with the aid of a gentle heat; borax, 9 p., is dissolved in water, 240 p.; the two fluids are brought to a uniform temperature, not exceeding 60° C., and the aqueous solution is poured into the oily one in a continuous stream, stirring gently for a minute or two; then oil of geranium, 1 p., and oil of rose, 10 to 20 drops, are added while stirring, and the product is poured into jars before cold. The cold cream so obtained is more white, soft and smooth, pleasantly odorous, keeps well in the heat of summer and the cold of winter, and becomes only slightly thinner in summer.—Amer. Journ. Pharm., March, 1901, 117–119.

Unguentum Hydrargyri Nitratis, B. P.—Unnecessarily Complicated Directions.—W. Lyons observes that the B. P. formula for unguentum hydrargyri nitratis gives a very good ointment if care be taken. The olive oil and nitric acid are the usual sources of trouble and should always be carefully examined. The only point open to criticism is the method of making. It may be safely laid down as a general rule, that a complicated process should never be authorized if a simpler one gives an equally good result. Now the B. P. method is a complicated one. We are told to "heat the lard and olive oil together on a sand-bath so that the mixture when transferred to a heated earthenware jar shall be at a temperature of about 290° F." That means that either the earthenware jar must be heated on another sand-bath to 290° F., and the oil and lard heated to a similar degree, or the oil and lard must be of a temperature sufficiently above 290° F., so that when poured into the colder jar the heat thereby lost shall not cause the temperature of the oil and lard to fall below 290° F. The much simpler method of the B. P., 1885, in which these directions are omitted, will give equally good results.—Pharm. Journ., Jan. 12, 1901, 29.

Naftalan Paste—Formula and Use.—Gernsheim has used naftalan with more or less advantage in the treatment of bed-sores and acute exanthemata by making a stiff ointment or paste according to the following formula: Naftalan, wool fat, zinc oxide, and boric acid, of each equal parts. He has tried it in a varied list of diseases, but the best results were obtained with those mentioned.—Pharm. Journ., Aug. 25, 1900, 246; from Therap. Monatsh., *14*, 278.

Zinc Ointment—Preparation.—The ever-recurring subject of the preparation of zinc ointment was presented in two papers at the meeting of the Pennsylvania Pharmaceutical Association in 1900. D. J. Thomas finds that the official formula (U. S. P., 1890) will yield a satisfactory product if slightly modified. This consists in using *de-hydrated* lard, benzoinated, the presence of water in ordinary lard doubtless causing the granulation and decomposition of the ointment as ordinarily prepared. The zinc oxide should stand the test of the Pharmacopœia, and the manipulation should be as follows: Sift the zinc oxide through a No. 20 sieve into a porcelain or wedgewood mortar. By means of a water bath heat the benzoinated lard in a porcelain capsule and while in a melted state thoroughly incorporate it with the zinc oxide. Transfer the whole to the capsule, reheat it on the water-bath, and when sufficiently melted strain through moderately-fine gauze of cheese cloth, after which it should be stirred constantly until cold. The pharmacopœial permission to add 5 per cent. of white wax or more if necessary is judicious; to stand the heat of summer the quantity of wax should be increased to 10 per cent. Mr. Stedem incidentally exhibited a sample of zinc ointment prepared practically in the same way ten years before, which after this long lapse of time had kept perfectly sweet, and was free from rancidity.

A second paper on the same subject was that read by John F. Patton. He finds a good article of zinc oxide to be of primary importance, and has used with perfect satisfaction the English article known as "Hubbuck's," employing the following formula and process: Triturate 8¾ ounces of the zinc oxide with 6 ounces of olive oil to a smooth paste in a mortar of ample capacity and well warmed. Then add a previously melted mixture of 6⅝ ounces of white wax and 33⅓ ounces of washed lard, and stir constantly until cool. Finally add 1½ ounces of

Tincture of Benzoin, prepared by the following formula: Benzoin in tears, 2 ounces; ether fort., 4 ounces. Macerate until dissolved, filter and add 2 ounces of castor oil. For preparing

Benzoinated Lard this tincture, in the proportion of ½ ounce for each pound, will answer admirably. Mr. Patton also suggests modifications of the formulas of several other ointments. Thus

Ointment of Mercuric Nitrate when made by the formulæ of the U. S. P. 1870 and 1880 gives no end of trouble on account of its liability to granulate on keeping. This disposition is obviated completely if one-third of the lard is replaced by petrolatum. A very satisfactory

Cold Cream of the right consistency and unexceptionable keeping quality results on employing the following formula: White wax, 1½ ounces; spermaceti, 1½ ounces; oil of sweet almonds, 4 ounces. Melt them together on a water-bath, add a warm solution of ½ dram of borax in 5 drams of rose water, stir until cool and perfume with 20 drops of oil of lemon and 10 drops of oil of rose.—Proc. Penna. Pharm. Assoc., 1900, 116–118.

Ointments—Securing Smoothness by Churning.—John K. Williams calls attention to the value of a small churn, which may be inexpensively constructed from a tin can, for securing smooth ointments, such as oxide of zinc ointment, cold cream, etc. In the case of the former, when the lard and zinc are in a fluid condition, the mixture is transferred to the churn, when with three minutes churning a white ointment results of such smoothness as an hour's stirring will not accomplish. In the same way a beautiful, soft, fluffy white cold cream is obtained. In no case should the stirring or churning be begun before the fat mixture begins to congeal. It is useless to do so while the fat is hot. To secure satisfactory ointments, the author insists that the pharmacist should prepare his own

Benzoinated Lard, using nothing but pure leaf lard and benzoin of assured quality—not with something called "benzoin," and that is not a proper article.—West. Drugg., July, 1900, 357–359.

Ointments—Formulas of the Philadelphia Hospital.—The following formulas for ointments have been adopted in the recently revised edition of the "Pharmacopœia of the Philadelphia Hospital:"

Unguentum Album (Hornor): Zinc oxide, 2.0 Gm.; alcohol, 4.0 Cc.; castor oil, enough to make 30.0 Cc.

Unguentum Balsami Peruviani: Balsam of Peru, 4.0 Gm.; petrolatum, enough to make 30.0 Gm.

Unguentum Hydrargyri Ammoniati (P. H.): Ammoniated mercury, 3.0 Gm.; glycerin, 2.0 Cc.; cerate, enough to make 30.0 Gm.

Unguentum Ichthyoli: Ichthyol (Am.), 4.0 Gm.; cerate, 26.0 Gm.

Unguentum Mauri (Maury): Powd. rhubarb, 2.0 Gm.; powd. opium, 2.0 Gm.; ointment of mercuric nitrate, 4.0 Gm.; petrolatum, enough to make 30.0 Gm.

Unguentum Petrolati Carbolatum: Carbolic acid, 2.0 Cc.; glycerin, 2.0 Cc.; petrolatum, enough to make 30.0 Gm.

Unguentum Zinci Carbolatum: Carbolic acid, 2.0 Cc.; glycerin, 2.0 Cc.; ointment of zinc oxide, enough to make 30.0 Gm.—Amer. Journ. Pharm., October, 1900, 505.

Ointments—Formulary of the German Hospital, Philadelphia.—M. I. Wilbert makes some practical observations on the composition and uses of ointments, with particular reference to the substitution of petrolatum for lard in all cases where this is practicable, and communicates the following formulas which have been in use in the German Hospital, Philadelphia, for the past ten years with uniform satisfaction:

Ointment of Boric Acid: Boric acid, 100; petrolatum, 900.

Ointment of Carbolic Acid: Carbolic acid, 50; petrolatum 950.

Ointment of Rose Water: Spermaceti, 125; white wax, 120; cotton seed oil, 600; sodium borate, 5; distilled water, 190; oil of rose, 2 drops.

Ointment of Belladonna: Alcoholic extract of belladonna leaves, 100; diluted alcohol, 50; petrolatum, 850.

Ointment of Belladonna and Mercury: Belladonna ointment, 500; mercurial ointment, U. S. P., 500.

Ointment of Nutgall: Nutgalls in fine powder, 200; petrolatum, 800.

Ointment of Gall and Opium: Powdered opium, 5; nutgall ointment, 95.

Ointment of Ammoniated Mercury: Ammoniated mercury, 100; petrolatum, 900.

Ointment of Yellow Mercuric Oxide: Yellow mercuric oxide, 20; petrolatum, 980;

Ointment of Red Mercuric Oxide; Red mercuric oxide, 100; petrolatum, 900.

Ointment of Iodine: Iodine, 40: potassium iodide, 10; water, 10; petrolatum, 940.

Ointment of Iodoform: Iodoform, 100; petrolatum, 900.

Ointment of Tar: Tar, 250; petrolatum, 250.

Ointment of Lead Iodide: Lead iodide, 100; petrolatum, 900.

Ointment of Potassium Iodide: Potassium iodide, 100; water, 50; petrolatum, 850.

Ointment of Stramonium: Extract of stramonium, 100; diluted alcohol, 50; petrolatum, 850.

Ointment of Sulphur: Sublimed sulphur, 300; petrolatum, 700.

Ointment of Turpentine (compound resin cerate): Resin, 240; yellow wax, 240; petrolatum, 300; oil of turpentine, 120; linseed oil, 100.

Ointment of Zinc Oxide: Zinc oxide, 200; petrolatum, 800.

Ointment of Zinc and Ichthyol: Ichthyol, 50; ointment of zinc oxide, 950.

Concerning the ointment of yellow mercuric oxide, the author observes that the majority of oculists expect this weaker (2 per cent.) ointment, which is popularly known as Pagenstecher's eye salve, when they write for "Ung. Hydrarg. Ox. Flav." The official 10 per cent. ointment is considered too strong. The author's practical observations in connection with the different formulæ will be referred to with interest and profit by the manipulator in Amer. Journ. Pharm., Nov., 1900, 513–519.

Ointments—A New Basis.—H. Foster observes that neither lard, vaselin, or lanolin are satisfactory by themselves as a general basis for ointments; but he finds that a good general basis, particularly suited for the admixture of the medicinal ingredients in the cold, is obtained by melting together equal parts by weight of these three substances, stirring until well mixed and then straining. Anhydrous lanolin is to be used, and the vaselin should be white.—Pharm. Journ., June 1, 1901, 694.

VINA.

Wine of Coca Leaves—Improved Formula.—Jno. H. Haydon, Jr., recommends the following easy method of making wine of coca leaves, corresponding in strength to the National Formulary preparation, by the following formula:

Coca leaves (ground)	4 ozs.
Hot water	1 pint.
Alcohol	6 fl. ozs.
Sugar	6 ozs.
Port wine (domestic), enough to make	4 pints.

Moisten the drug with the hot water and allow to macerate three or four hours. If dry, moisten with wine and pack in percolator and percolate with wine until three and a half pints are obtained. In this dissolve the sugar, add the alcohol and strain, adding sufficient wine to make four pints.—Amer. Drug., Nov. 26, 1900, 307.

Miscellaneous Formulas and Subjects.

Galenical Preparations.—Use of Inorganic Acids in Their Processes.—Richard Strauss mentions the galenicals in the preparation of which one or the other inorganic acid has heretofore been proposed or employed, and briefly points out the objects and utility claimed for their application for these purposes by different authors, with numerous references to the original papers. In a foot-note to the first installment of this paper, the editor of the Pharmaceutical Review observes that he had pointed out several months ago that insufficient attention was being paid to the individuality of drugs in the preparation of galenicals, either from the chemical or physiological point of view, and that, therefore, any information, old or new, that emphasizes the individual treatment of drugs, or throws new light on the subject, should be welcome. Mr. Strauss' summary will be referred to with advantage by experimenters engaged in the attempt to place galenical preparations on a more scientific basis. A brief enumeration of the acids and the drugs to which they have been applied may find place here, as follows:

Hydrochloric Acid: To aconite, conium, cinchona, ergot, haematoxylon, ignatia, ipecacuanha, nux vomica, opium, pilocarpus, tea.

Sulphuric Acid: To aconite, cinchona, gentian, rose, squill.

Carbonic Acid: To the extraction of vegetable drugs in general.

Nitric Acid: To cinchona, lactucarium, stillingia.

Phosphoric Acid: To cinchona.—Pharm. Rev., July and Aug., 1900, 299–303 and 362–367.

Preparations for External and Local Use—Review.—C. S. N. Hallberg has made a comprehensive study of the different classes of preparations employed in medicine either for external or local use, and has communicated the results of his study in a series of papers which are published in the "Western Druggist" under the following headings: "Ointments" (Dec., 1900, 652); "Suppositories" (Jan. 1901, 7); "Oleates, Plasters and Cerates" (Febr., 1901, 57); "Miscellaneous Dermatic Preparations" [Liniments, Modern Dermatologic Preparations, etc.] (March, 1901, 113); "Sterilization and Surgical Dressings" (April, 1901, 171). These studies have been made in connection with revision of the U. S. P., and merit careful perusal.

Iodized Meat Preparations—Methods of Preparation and Utility.—Conrolin–Tamisier suggests several iodized meat preparations which contain the iodine in a form that seems to insure their use in medicine as substitutes for less desirable preparations now in common use. If 20 Gm. of powdered meat are intimately mixed with 1 Gm. of iodine, and the mixture is heated on a steam bath until a sample of it no longer gives a yellow color to 90 per cent. alcohol, a solid product is obtained, from which the iodine may be again completely extracted by boiling water, not in its

original condition, however, but in organic combination. The aqueous solution does not communicate a violet color to chloroform; neither is iodine split off on addition of strong acids. The iodine may, however, be liberated again by means of ferric chloride and its quantity thus estimated. Given internally, iodine soon manifests itself in quantities in the urine, but comparatively large doses of the iodized meat powder may be given without producing the well-known contingent effects observed when the inorganic iodine compounds are administered. The author finds furthermore, that a stable

Iodized Meat Juice may be obtained if, instead of adding water to the chopped meat a 0.2 per cent. solution of iod-iodide of potassium is added before expression. The iodine enters into combination with the albuminoids of the meat and prevents the putrescence of the meat juice completely. The quantity of iodine in this preparation is too small to exert marked physiological action, and seems solely to render the juice stable.—Pharm. Ztg., Mar. 30, 1901, 264; from L'Union Pharm., 1901, No. 3.

Infant Foods—Directions for Home Preparation.—Dr. Henry Dwight Chapin in an admirable paper entitled "Substitute Infant Feeding," observes that there is no end to the number of the so-called "perfect substitutes for mother's milk" that are widely advertised, but that the mainstay of successful bottle-feeding is good cow's milk. The infants who cannot take properly prepared cow's milk are very rare, and he proceeds in accordance with this view to point out to practitioners of medicine, first, how good cow's milk may be secured, and second, how to change or modify it so that it shall be as near as possible an approach to mother's milk. The subject is one upon which the pharmacist is so often called upon for advice, that information so clear and concise as that given by Dr. Chapin will be consulted with great advantage. Indeed, it is to be regretted that it is impracticable within the scope of this report to do more than touch upon the most important observations made. The first problem for the physician is to secure a supply of good fresh milk, and the author enters very thoroughly into the precautionary methods that are necessary to secure such a supply anywhere with the exercise of a little care. That which is clean, aerated, cooled and bottled immediately after milking, and kept below 60° F., until delivered, is the article to be chosen. The richness of the milk and cream depending upon the breed of cattle supplying the milk, the physician in a given neighborhood should find out what breed of cattle supply the milk, in order to know about the proportion of butter fat contained in the milk; remembering, firstly, that the milk of one dairyman will run quite uniform from day to day, as the variations in the milk of individual cows will compensate each other, and secondly, that the amount of butter fat in the milk of cows of different breeds may be roughly estimated as follows: (1) Fancy, full-blooded Guernseys and Jerseys, 5 per cent. and over; (2) ordinary Jerseys and

Guernseys, known as "butter cows," 4 per cent. and over; Ayrshire, Holsteins and common stock, known as "milk cows," 3 per cent. and a little over.

Having secured good cow's milk, the next step is to adjust its composition approximately to that of mother's milk. The fat in the latter is usually between 3 per cent. and 5 per cent., or nearly three times the percentage of proteids contained in it, which vary from 1 to 2 per cent., while the sugar is between 6 per cent. and 7 per cent. Cow's milk, on the other hand, contains from 3 per cent. to 5 per cent. of butter fat, while the proteids average 4 per cent. and the sugar 4 per cent. to 5 per cent. The proteids are therefore to be reduced, and the sugar slightly increased. The adjustment is accomplished by taking

Top Milk, and diluting this suitably according to the estimated quality of the original milk. This top milk, rich or poor in fat, is obtained by taking all the cream and part of the remaining milk as may be required, and top milk can thus be prepared in which the fat is one and one-half to five times that of the proteids, the proteids and sugar being assumed to be 4 per cent. each. It is readily and accurately separated from the milk, as now customarily supplied in quart bottles, by means of a dipper measuring exactly one fluid ounce, the first fluid ounce being removed with a teaspoon to prevent spilling. The first nine ounces or dipperfuls so collected contain about three times as much fat as the same quantity of the original milk, and this serves as a basis for calculating the subsequent dilution. In practice, top milk may thus be drawn off of any desired richness, and this then diluted, two, three, four, five, six or eight times. Then, for every twenty or twenty-five ounces of food, one ounce of sugar is to be added in order to bring this element up to the proper proportion.

The next important step is to get the cow's milk as nearly as possible to the same physical condition as mother's milk. The diluent (for the top milk) prefered by the author is a wheat, barley or oatm al gruel, the starch of which has been dextrinated by the action of diastase. A heaping tablespoonful of flour, made from one of these cereals, is boiled with about a pint and a half of water for fifteen minutes, is then set into cold water to cool, and when sufficiently cool to taste, a teaspoonful of a preparation of diastase, made as indicated below, is added. About a pint of thin, watery gruel is thus obtained, which renders the milk curd porous, provokes the secretion of the digestive juices, and is regarded as a great improvement on water as a diluent. The author prefers the employment of diastase itself, rather than the numerous preparations of the market containing other malt ingredients, and finds an

Infusion of Diastase prepared as follows to answer the purpose admirably: A tablespoonful of malted barley grains is covered with two tablespoonfuls of cold water, allowed to remain in the refrigerator over night, and the liquid, amounting to about one tablespoonful, is strained off when it is ready for use in the proportion indicated.

The question of pasteurization, heating to 167° F—or sterilization, heating to 212° F.—is also briefly discussed by the author. Under the conditions demanded by the author, neither of these is necessary, but in summer time, when it is impossible to keep milk below 60° F., it is best to have it pasteurized as soon as received. Finally, there are times when infants cannot digest milk in any form, no matter how much it may be diluted, nor what diluent is employed. They may be given mutton broth, from which the fat has been removed, extracted beef-blood and water, dextrinized wheat or barley, or dextrinized gruel, to which either white or yolk of egg has been added, the following formulas being recommended:

Dextrinized Gruel and White of Egg: Dextrinized wheat flour gruel, 8 fluid ounces; white of egg, 581 grains; two even teaspoonfuls of sugar. This food contains about 2 per cent. of proteids, 4 per cent. of digested starch, and 3 per cent. of sugar.

Dextrinized Gruel and Yolk of Egg: Dextrinized wheat flour gruel, 8 fluid ounces; the yolk of one large egg (288 grains), and two even teaspoonfuls of sugar. This food contains about 1.7 per cent. of fat; 1.7 per cent proteids, and 7 per cent. of total carbohydrates.—Amer. Jour. Phar., Dec., 1900, 581–589; from Journ. Amer. Med. Assoc., xxxv, 71.

Food Products—Objection to Chemical Preservatives.—The supreme sanitary council of the Austrian Empire recommends that the use of chemical preservatives, such as salicylic, boric, sulphurous, or benzoic acids, their salts, or formaldehyde, be prohibited for the preservation of foods in general or certain foods in particular, on the ground that while these preservatives may not be injurious in themselves, they become injurious because their use may prevent an observance of proper care in treatment and cleanliness in the preparation of such foods, and may be employed for the preservation from further change of such that are already infected or in process of incipient change.—Apoth. Ztg., July 7, 1900, 462; from Oesterr. Chem. Ztg., 1900, 84.

Condensed Milk—Average Commercial Quality.—F. E. Nice communicates in the form of condensed tables the average results of the analyses of ten different samples of widely-known domestic milks (condensed), obtained from the open market. In summing up the results obtained, he finds it easy to vouch for the purity of all the samples and that they are worthy of high commendation. He was unable to detect any of the adulterants or preservatives that might be suspected in these preparations, and found only two samples in which sufficient change had occurred prior to the opening of the can to render them decidedly acid, while the odor was natural in all but four cases.—Proc. Penna. Pharm. Assoc., 1900, 172–176.

Perfumes—Advantageous Preparation from "Concrete" Essences.—Geo. C. De Lessing notes the advantage of the so-called "concrete" essences

for the preparation of perfumes over the "flower pomades" hitherto employed for this purpose. These concrete essences have been supplied during the past eight or ten years, and are offered in two consistencies, hard and soft. Like pomades, they will yield three washings, which are prepared as follows: Take 6 drams of the concrete perfume—any odor except violet, of which only 4 drams—for 128 ozs. of 90 per cent. alcohol. Rub it up perfectly smooth with 1 dram of the alcohol, so as to break up all lumps, and add more alcohol from time to time, continuing the trituration, until almost 1 pint of liquid is produced. Place this into a 2-gallon jar and wash out the mortar with enough of the alcohol to make 128 ozs. of the essence. After frequent shaking during 24 hours, the essence is filtered off, this constituting "washing No. 1." The undissolved portion is shaken with another 128 ozs. of alcohol, in the same way, and the filtrate from this is "washing No. 2"; while "washing No. 3" is obtained in the same way from the residue from "washing No. 2." The second and third washings have their special uses, or are used for cheapening and diluting the stronger perfumes without waste. Leading odors are: Cassia, jasmine, orange, rose, tuberose, lily of the valley, and violet. The author gives a number of formulas, from which the following are selected as examples:

WHITE ROSE.

Jasmin, concrete, washing No. 1	2 lbs. 5 oz.
Violet, concrete, washing No. 3	3 lbs. 7 oz.
Violet, concrete, washing No. 1	1 lb. 2 oz.
Oil of neroli (synthetical)	10 gr.
Oil of patchouli or asarum canadense	20 gr.
Oil of rose geranium	½ dr.
Esprit rose oil (1 per cent.)	1½ lb.
Tincture of orris root	½ oz.

All by weight. Mix all well, let stand for two or more hours, and then add 1 lb. o rose or ordinary water in small quantities, shaking well after each addition. Let stand for twenty-four hours, and filter through linen and finely-powdered fullers' earth.

HELIOTROPE BOUQUET.

Orange, concrete, washing No. 3	8 lbs.
Heliotropol	$3\frac{9}{16}$ oz.
Oil of ylang-ylang (synthetical)	80 gr.
Oil of neroli (synthetical)	27 gr.
Esprit rose oil (1 per cent.)	½ oz.
Ionone (10 per cent.)	43 gr.

Mix well and keep in stock as "oil of Heliotrope."

JOCKEY CLUB.

Cassia, concrete, washing No. 1	4 lbs.
Jasmin, concrete, washing No. 1	10 lbs. 10 oz.
Tuberose, concrete, washing No. 1	9 lbs. 9 oz.
Tincture of ambergris (1 per cent.)	9 lbs. 9 oz.
Tincture of civet (1 per cent.)	9 lbs. 7 oz.

Esprit musk baur (1 per cent.)	12	oz.
Tincture of orris-root	60	oz.
Tincture of Peru balsam	3	oz.
Tincture of storax	6	oz.
Esprit rose oil (1 in 64)	10	lbs.
Esprit vanillin (1 in 64)	1½	lb.
Oil of bergamot	11	oz.
Oil of cloves	½	oz.
Oil of lavender (French)	2	oz.
Oil of neroli (synthetical)	1/16	oz.
Oil of santal	1⅛	oz.
Esprit heliotropol (1 in 16)	4½	oz.
Orange, concrete, washing No. 3	20	lbs.
Rose or ordinary water	2	lbs.

Keep this mixture for some days, shaking occasionally. Label "oil of Jockey Club.

VIOLET BOUQUET.

Jasmin, concrete, washing No. 3	3	lbs.
Esprit orris oil, concrete (1 per cent.)	12¼	oz.
Esprit musk baur (1 per cent.)	7⅛	oz.
Oil of lignaloe	8	gr.
Oil of bergamot	8	gr.
Oil of lemon	12	gr.
Rose or ordinary water	49	oz.

Mix well, and after two or three days filter through finely-powdered fullers' earth.

WHITE LILAC.

Rose, concrete, washing No. 3	10	lbs.
Tuberose, concrete, washing No. 3	10	lbs.
Lily of the valley, concrete, washing No. 3	10	lbs.
Orange, concrete, washing No. 3	10	lbs.
Jasmin, concrete, washing No. 3	4	lbs.
Oil muguet (Dessire)	1 15/16	oz.
Oil of rose geranium	34	gr.
Oil rosezone (artificial rose oil)	128	gr.
Esprit cedar-leaves oil (1 in 64)	1¾	oz.
Esprit musk baur (1 per cent.)	64	gr.

Mix, and after three days filter.

Cheaper perfumes may be obtained by employing some of the commercial "Perfume Oils"—such as heliotrope, jockey club, and employ second and third washings, wholly or in part, as diluents. Examples of these are also given.—Chem. and Drugg., Jan. 26, 1901, 117.

Tooth Powder—Formula.—B. S. Cooban recommends the following formula to yield a very satisfactory and salable tooth powder:

English precipitated chalk	42 ounces.
Powdered sugar of milk (Merck's)	14 ounces.
Powdered cuttlebone	2 ounces.
Powdered orris root	2 ounces.
Powdered castile soap	2 ounces.
Carmine	30 grains.
Oil of cassia	36 minims.
Oil of wintergreen (true)	36 minims.

Powder the carmine, use a few drops of ammonia water to form a smooth paste, add the powdered cuttlebone, and mix thoroughly; next add the chalk in portions, mixing thoroughly after each addition to secure uniform distribution of tint; then add the balance of the material, and rub through a No. 60 sieve two or three times. While this manipulation is somewhat tedious, there is no other way to obtain the best results.—Bull. Pharm., Mar., 1901, 102.

Hair Tonic—A Good Formula.—B. S. Cooban highly recommends the following formula for a hair tonic:

Oil of rose geranium	3	drachms.
Oil of sweet orange	10	drachms.
Oil of bergamot	10	drachms.
Peruvian balsam	2½	ounces.
Tincture of cantharides	4	ounces.
Tinctnre of cinchona	7	ounces.
Soap liniment	15	ounces.
Alcohol	35	ounces.
Cologne	35	ounces.
Carmine	45	grains.
Brandy, enough to make	18	pints.

Mix the whole together, allow to stand for a month and filter.

—Bull. Pharm., April, 1900, 145.

Shampoo — Formula. — B. S. Cooban recommends a formula for "the best shampoo," the basis of which is the U. S. P. tincture of green soap. The formula is as follows:

Tincture of green soap	1 pint.
Potassium carbonate	1 ounce.
Water, enough to make	1 gallon.

Perfume, a sufficient quantity.

—Bull. Pharm., April, 1901, 146.

Oiled Silk—Handy Method of Keeping.—A. B. Burrow, to avoid the inconvenience of unrolling and rolling up oiled silk from original packages and containers, makes use of a Hartshorn shade roller, which may be fastened to the underside of a shelf or any other convenient location. The silk, with the accompanying paper, is rolled on, and may then be exhibited or used and re-rolled automatically, without waste of time, and secure against damage. Protection from dust may be effected by means of a semi-circular piece of tin placed on the top of the roller. — Merck's Rep., Aug., 1900, 354.

C. New Remedies

and trade-named specialties.

Abrin is the name given to the extremely poisonous proteid or mixture of proteids obtained from jequirity seeds—*Abrus precatorius*. It keeps for

a limited time only and is preferably prepared during the winter months. Pharm. Journ., May 25, 1901, 665; from E. Merck's Annual Rep., 1900.

Acetopyrine is a new antipyretic specialty composed of antipyrine and acetyl salicylic acid, and forming a whitish powder. It is claimed to be free from unpleasant effect on the stomach or intestine even when given in daily doses of 5 to 7 Gm., produces no ringing in the ears nor persistent perspiration as is the case when salicylic acid is administered. Its antipyretic action is prompt and energetic, and has been found useful in rheumatic and neuralgic affections, migraine, etc.—Pharm. Ztg., Oct. 20, 1900, 816; from Wien. Klin. Wohschr., 1900, No. 39.

Acetopyrine is a whitish crystalline powder, melting at 64° to 65° C., sparingly soluble in cold water, more freely in warm water, freely in alcohol, chloroform, or warm toluol, but less freely in ether or petroleum spirit. It is stated to be particularly useful in cases of acute rheumatism, and has also proved an effective analgesic in neuralgic headache, migraine, sciatica, and polyneuritis. The dose is 0.5 Gm. six times daily.—Pharm. Journ., May 25, 1901, 665; from E. Merck's Ann. Rep. for 1900.

Actol is the name given by Crédé to "silver lactate." It has been successfully employed in treating abscesses at the roots of teeth, by injecting a freshly prepared solution (1 : 500) through the orifice of the fistula.—Pharm. Journ., May 25, 1001, 665; from E. Merck's Ann. Rep. for 1900.

Albargin is the name given to "galactose silver," which is recommended as a remedy for gonorrhœa.—Pharm. Ztg., Mar. 6, 1901, 196.

Alboferrin is the name given to an albumen preparation containing 0.68 per cent. of iron. It is a light brown, nearly tasteless and odorless powder, permanent, and readily soluble in water.—Pharm. Ztg., Jan. 16, 1901, 50; from Zschr. Oest. Ap. Ver.

Alkarnose is the name given to a new nutrient preparation, in powder, containing 23.6 per cent. of albumose, 55.3 per cent. of maltose, dextrin, and dextrose, 17.7 per cent. of finely emulsified fat, and 3.4 per cent. of soluble nutrient salts.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Alsol is the name given to an aqueous solution of "Aluminum-Aceto-Tartrate," a salt occurring in white crystals freely soluble in water. This solution is recommended as an innocuous substitute for lead acetate, and is said to be more powerful as an astringent and antiseptic than aluminum acetate.—Pharm. Jour., May 25, 1901, 665; from E. Merck's Ann. Rep. for 1900.

Aniodol is the name given to a French specialty which is said to be a 1 per cent. aqueous solution of trioxymethylene, containing a little glycerin and an allyl derivative. It is recommended as an antiseptic and deodorant.—Pharm. Journ., May 25, 1901, 665; from E. Merck's Annual Rep. for 1900.

Anozol is the name given to a mixture of 10 per cent. thymol and 90 per cent. iodoform.—Pharm. Ztg., Mar. 30, 1901, 263.

Antitussin is the name given to an ointment composed of 5 per cent. of difluordiphenyl, 10 per cent. of vaselin, and 85 per cent. of wool fat. It is used for the treatment of whooping cough.—Pharm. Journ., May 25, 1901, 665; from E. Merck's Ann. Rep. for 1900.

Antitussin Verweii not to be confounded with the antitussin of Valentiner and Schwarz, which is an embrocation containing difluordiphenyl as active component) is a syrup of thyme, prepared similarly to Tæschner's "pertussin" (see below), and recommended as a remedy for whooping cough.—Pharm. Ztg., Feb. 27, 1901, 175.

Antityphus Extract is the name given to a preparation obtained from the spleen, bone-marrow and brain of hares which have been rendered immune against typhus fever, and which, it is claimed, has been used with success in cases of abdominal typhus. It is a more or less red, clear fluid, having an alkaline reaction, and is not used hypodermically, but is given by the mouth.—Pharm. Ztg., Feb. 13, 1901, 131; from Wien Klin. Wschr.

Aphroditin is the name given to a nutrient product, recommended to overcome leanness and claimed to be prepared from milk and vegetable albumen, peptone, oatmeal, sugar, cream of tartar, quinine, iron albuminate, etc. According to a recent analysis, however, it becomes apparent that it is simply oatmeal, to which iron, sodium bicarbonate and calcium phosphate are added in small quantities, the mixture being flavored with coumarin.—Pharm. Ztg., June 15, 1901, 483.

Aphthenol is the name given to a prophylactic against the mouth and hoof disease of animals. A tablespoonful given to healthy animals is said to prevent infection.—Pharm. Ztg., May 22, 1901, 413.

Argentamin—Use in Tuberculosis.—It is stated in "E. Merck's Annual Report," for 1900, that argentamin has been successfully employed for the internal treatment of tuberculosis of the intestine. It is given in 0.5 to 1.0 per cent. solutions, to which a little glycerin is sometimes added, in doses of a teaspoonful to a tablespoonful at intervals of two or three hours.—Pharm. Journ., May 25, 1901, 665.

Argentol, according to "E. Merck's Annual Report" for 1900, has been recommended as an intestinal antiseptic, because it is insoluble in the gastric juice, and because in the presence of intestinal juice it splits up into oxyquinoline and silver, both of which exercise a powerful antiseptic action. The daily dose may be raised to 1 Gm. if necessary.—Pharm. Journ., May 25, 1901, 665.

Arsycodile is the name employed by Dr. E. Bloch to designate "sodium cacodylate," supplied under his direction in form of solution, for subcutaneous use, and in form of pills. The solution is supplied in glass tubes containing 0.05 Gm. of sodium cacodylate in a sterilized condi-

tion. The pills contain 0.025 Gm. of the chemically pure cacodylate. Arsycodile is also supplied in the form of an iron compound, pills containing 0.025 Gm. of iron cacodylate, each being supplied as a specific in anæmia and chlorosis, whilst the sodium compound is recommended in neurasthenia, in skin diseases, malaria and diabetes. — Pharm. Ztg., Feb. 13, 1901, 131.

Artemissin Pills are said to be composed of ferrous oxalate, artemissin and quassin, and are offered as a reliable remedy for chlorosis and anaemia.—Pharm. Ztg., Jan. 16, 1901, 50.

Aspirine is the name given to "Aceto-Salicylic Acid." It has been largely employed as a substitute for salicylic acid and the alkaline salicylates, its after-effects being less unpleasant. It is used as an antipyretic or antineuralgic in doses of 1 Gm. three to six times daily, and is also given as an enema, 10.0 Gm. being dissolved in sufficient alcohol, then 125.0 Gm. of water are added, and finally 10.0 Gm. of sterilized glycerin. —Pharm. Journ., May 25, 1901, 765; from E. Merck's Ann. Rep. for 1900.

Atrabilin is the name given by Wolffberg to a fluid extract of the suprarenal capsule, having a deep yellow color, a meat-like odor, and forming a flocculent deposit on standing. It is claimed for this preparation that it produces all the effects of cocaine with the exception of mydriasis and anaesthesia. Its effects are more powerful than those of cocaine however. For functional hyperaemia and other affections of the eye it is prescribed in solution, with distilled water, containing 20 per cent. of atrabilin and 5 per cent. of boric acid.—Pharm., Ztg., *45*, 173.

Azymol is the name of an antiseptic, the composition of which has not yet been given. It is recommended for a variety of purposes.—Pharm. Ztg., Oct. 31, 1900, 843.

Bismutose is a fine, odorless and tasteless powder which becomes slaty-grey when exposed to light. It contains about 22 per cent. of bismuth and 66 per cent. of albuminoid matter. The composition is insoluble in water and other liquids, but dilute acids dissolve it partially when warmed, and it forms an opalescent fluid with dilute alkaline solutions, especially when heated. It has been taken internally for gastric affections of an infectious or diarrhœic character, etc., and used externally as a dusting powder in the treatment of eczema and burns. The dose for infants is a salt-spoonful several times daily, for children half to one teaspoonful three or four times daily, and for adults a proportionately larger quantity. —Pharm. Journ., May 25, 1901, 666; from E. Merck's Ann. Rep. for 1900.

Borlan is the name given to cuticular cream (or salve) containing boric acid.—Pharm. Ztg., March 13, 1901, 217.

Borogen is "boric acid ethyl ester," recommended for the disinfection

of the respiratory organs in the form of inhalations.—Pharm. Centralh., 1901, No. 7.

Bromocoll is the name given to a compound of bromine, tannin and gelatin, containing 20 per cent. of bromine in organic combination. It constitutes a faint yellowish, odorless and tasteless powder, which is almost insoluble in acid fluids (the fluids of the stomach) but gradually dissolved in alkaline fluids, and consequently in the intestinal tract. It possesses mild sedative action, similar to that of the alkaline bromides, and also has proven useful as a dusting powder and in the form of ointments to wounds, suppurations, etc., to alleviate itching.—Pharm. Ztg., Sept. 29, 1900, 759.

Calcinol is the name given by Mackie to "calcium iodate" which is recommended as an antiseptic, both for the prevention of putrefaction of putrescible organic substances and as a gastro-intestinal antiseptic. It is odorless and tasteless, but when long kept aquires a faint iodine odor. It is soluble in 380 p. of water at 15° C.—Pharm. Ztg., Feb. 27, 1901, 175.

Carboformol Glow-Blocks are small bricklets composed of paraformal embedded in charcoal. When ignited at one end, these bricklets or blocks continue to glow until completely consumed, the paraformal being then slowly converted into gaseous formaldehyde, and thus constitutes an effective and convenient disinfectant.—Pharm. Ztg., Mar. 6, 1901, 196.

Cerebrum, the normal nerve substance of the brain of sheep, and especially of the bulbus cerebri, is said to contain substances which are antagonistic to infections by hydrophobia, tetanus, epileptogenic toxins, alkaloids, and other poisons. It is suggested, therefore, that the cerebral substance should be used in the treatment of nervous diseases in cases in which it is reasonable to assume the existence of intoxications of an endogenous or exogenous origin, having their origin more particularly in the nerve centres. An emulsion for injection below the skin of the back and thighs has been prepared by triturating the brain of a freshly killed rabbit, removed under aseptic conditions, with 15 Cc. of physiological salt solution.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Chinotropin is the name given to "urotropin urate," (quinate? Rep.) which has been recommended to decrease the secretion of uric acid. It is a white powder readily soluble in water. Clinical experiments made by Nicolaier and Hagenley point out that the remedy does not decrease the amount of uric acid in gouty cases, but nevertheless recommend its retention for fur thertherapeutic experiments, cautioning only that the recommended daily doses be not increased, excessive doses being likely to produce irritation of the bladder.—Pharm. Ztg., Feb. 13, 1901, 131.

Chrysoleïn is the name given to a preparation of "sodium fluoride," of French origin.

Citrophene, a new antipyretic, has proved to be a good antineuralgic, antirheumatic and antipyretic, free from secondary effects, and its use is recommended in affections of the joints of an acute and subacute-chronic character, angina, acute exanthema in children, typhus abdominalis, influenza, and all forms of neuralgia. In morphine cures it acts as a good sedative, and it may be administered without hesitation in grave organic affections of the heart. The dose for adults is from 0.5 to 1.0 Gm. thrice daily in a little mineral water. The following has been prescribed for whooping cough: Citrophene, 0.5 to 4.0 Gm.; distilled water, 70.0 Gm.; syrup, 30.0 Gm. One dessert or tablespoonful to be taken three or four times daily.—Pharm. Journ., June 1, 1901, 701; from E. Merck's Ann. Rep. for 1900.

Crotin is the name given to a poisonous albuminoid which, like *abrin* and *ricin*, causes the red corpuscles of the blood to agglutinate and deposit, though it does not produce that effect in the case of human blood. It causes raw and boiled milk to coagulate, and its toxic effects are not diminished by artificial digestion by means of trypsin and papayotin, but the presence of hydrochloric acid, as in pepsin digestion, considerably weakens its properties.—Pharm. Journ., June 1, 1901, 701; from E. Merck's Ann. Rep. for 1900.

Dermosapol is the name given to a superfatted soap, produced from oils, fats, wool fat, saponified by an insufficient quantity of alkali after the addition of some paraffin. The product is supplied in various combinations, such as balsam of Peru, potassium iodide, formaldehyde, thiocol, creosot, guaiacol, etc., and is recommended for the purpose of inunction in various diseases, particularly in tuberculosis and scrofula.—Pharm. Ztg., Feb. 20, 1901, 156.

Dionine is the name given to a prophylactic which appears likely to be very valuable in whooping cough and as a prophylactic in morphinism. It is also useful in certain uterine affections, being conveniently applied in suppositories containing dionine, 0.04 Gm., and oil of theobroma, 2.0 Gm. Dionine has also been largely employed in ophthalmic surgery, 2 per cent. solutions being found preferable as eye-washes, though 5 per cent. solutions are better for the production of chemosis.—Pharm. Journ., June 1, 1901, 701; from E. Merck's Ann. Rep. for 1900.

Dormiol (see Proceedings, 1900, 549) has been used with good results in cases of chlœra, pneumonia, erysipelas, angina, insomnia resulting from functional neurosis, tuberculosis, nephritis, etc. It is administered in solution, or in capsules containing 0.5 Gm. each, the dose being from 0.5 to 1.5 Gm. Dispensing is facilitated by keeping a 50 per cent. solution ready, and the unpleasant taste of the remedy may be masked with extract of liquorice or raspberry syrup.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Dymal is the name given to a fine, odorless dusting powder, which is

essentially composed of "didymium salicylate." It is also recommended in form of a 10 per cent. salve made with lanolin. According to C. Kopp, dymal is a non-irritant, antiseptic wound powder, the application of which diminishes the secretions and has been used with advantage in various diseases.—Pharm. Ztg., Febr. 13, 1901, 131.

Eigone, in various combinations, appears to attract attention in veterinary practice. Externally it has been used as a substitute for iodoform, and *sodo-eigone* has been used internally as a substitute for iodides. *Iodo-eigone* has been given in daily doses of 30.0 to 40.0 Gm. to horses, and 0.5 to 2.0 Gm. to dogs.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Epinephrin is the name given to one of the supposed active principles of the suprarenal gland. It differs from suprarenin.—Pharm. Journ., June 15, 1901, 754: from E. Merck's Ann. Rep. for 1900.

Erosin is the name given to a resinous extract prepared from *Chadamicum luteum*. It is said to posses diuretic and soporific activity, and also to serve as a worm-remedy.—Pharm. Ztg., Febr. 27, 190, 176.

Esanofele is the name given to anti-malaria pills composed of 0.1 Gm. quinine hydrochloride, 0.03 Gm. iron citrate, 0.001 Gm. arsenous acid, and 0.15 of vegetable extract.—Pharm. Ztg., Feb. 27, 1901, 176.

Euguform is the name given by Spiegel to acetylated methylenediguaiacol, which, in consequence of its impalpable character is regarded as being particularly useful to promote the healing of wounds. It is a grey-white, nearly odorless, dusty-fine, amorphous powder, and insoluble in water. Ciesielski has used it with good results in the treatment of lupus, and it has also proven useful in various other diseases of the skin and in the treatment of wounds. An unexpected side-effect was the rapid alleviation of pain, itching, etc., which have prompted its use, with satisfaction, in cases of burns.—Pharm. Ztg., April 13, 1901, 304; from Dermatolog. Centralbl., 1901, 206.

Eulactol is the name given to a nutrient preparation for infants, recommended in diarrhœic affections and rickets.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Euphthalmin is the trade name given to the hydrochloride of oxytolylmethylvinyl diacetone alkamine. This salt is closely related to "β-Eucain," differing from this salt in containing the radical of amygdalic acid in place of the radical of benzoic acid, and that an H linked to an N appears to substitute the methyl group of the eucain salt. It occurs as a white, crystalline powder, readily soluble in water. Therapeutically its action is anæsthetic without being poisonous or possessing irritant action, its use being confined to ophthalmic practice in form of a 2 per cent. solution.—Pharm. Ztg., Dec. 22, 1900, 988.

Eupyrin is the coined name given to "vanillin ethylcarbonate p-

phenentidin," which is recommended by Overlach as a mild, non-toxic antipyretic, particularly useful in the treatment of children and old persons, and in cases of fever characterized by extreme weakness. The new compound crystallizes in pale greenish-yellow needles, having a delicate vanilla odor, but perfectly tasteless. It melts at 87°–88° C., is sparingly soluble in water, but readily dissolved by alcohol, ether and chloroform.—Pharm. Ztg., Nov. 17, 1900, 889; from Centralbl. f. inn. Med., 1900, No. 45.

Euquinine is the name given to a new substitute for quinine in malaria and in tertian fevers. It is also given in daily doses of 1 Gm. as a prophylactic.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Faex Medicinalis is the name by which a preparation of "yeast" is supplied in both the liquid and dried form. It is said to be capable of destroying the toxin of diphtheria and to produce excellent effects in affections of the gastro-intestinal canal. Doses of three to four small teaspoonfuls of liquid yeast have been found to shorten the duration of influenza and modify the course of typhoid favorably. Dried yeast is generally prescribed in doses of one teaspoonful twice daily before meals, to be taken in beer, mineral water or wafers.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Fermé is the name given to a beer, claimed to be non-alcoholic. It is, however, described as being a turbid fluid, having an unpleasant taste, and evidently a very ordinary article of beer, containing, according to a recent analysis, 0.53 per cent. of vol. alcohol, together with 6.46 per cent. of extractive, 4 88 per cent. of sugar, 0.306 per cent. of mineral substance, and 0.055 per cent. of phosphoric acid.—Pharm. Ztg., June 15, 1901, 483.

Fersan is the name given to an iron compound, described as a ferruginous paranucleo-proteid, which is recommended as a nutrient in anæmia, chlorosis, etc. It is soluble in water, does not coagulate when boiled, and is not completely absorbed until it reaches the intestine. A small teaspoonful is taken thrice daily before meals, together with tea, milk, cocoa or soup.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Ferunculin is a basic preparation obtained from brewer's yeast, recommended in affections of the spleen and catarrhal affections of the stomach and intestines.—Pharm. Ztg., Oct. 3, 1900, 770.

Formol-Geranium is the name given to a mixture of two parts of formaldehyde solution (40 per cent.), with one part each of geranium oil and alcohol. It is used in cases of dental caries, being introduced into the root channels and pulp cavity with the aid of a thread of cotton wool.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Fortoin is the name given to "methylene-dicotoin," obtained by the

action of formaldehyde upon cotoin. It occurs as yellow needles (m. p. 211° to 213° C.), or a yellow powder, emitting a feebly cinnamon-like odor. It is freely soluble in chloroform, acetone, glacial acetic acid, and dilute alkalies, but only sparingly soluble in alcohol or ether, and quite insoluble in water. Fortoin possesses anti-diarrhœic properties and is administered in doses of 0.25 Gm. thrice daily. For painting the putrid and suppurating coatings of the tonsils, fortoin, 0.5 Gm., should be suspended in water, 45.0 Gm., and alcohol, 5.0 Gm. As an injection for gonorrhœa, mix fortoin, 1.0 Gm., 95 p. c. alcohol, 10.0 Gm., and distilled water, 150.0 Gm., shake well and add one tablespoonful to 100 Cc. of water.—Pharm. Journ., June 1, 1901, 702; from E. Merck's Ann. Rep. for 1900.

Globon is the name given to a nutrient preparation recommended as being good in various forms of deficient nutrition, and is said to have the advantage of counteracting sluggishness of the bowels.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Glycogenal is the name given to a substance supplied in the form of an odorless and tasteless powder which is said to be closely allied to glycogen and to exist in the animal system. It is insoluble in alcohol and ether, but forms opalescent solutions with water which become clear on adding acetic acid. Given in cases of phthisis, it is said to stimulate the appetite rapidly and hasten the restoration of strength. As much as 50.0 Gm. can be taken daily with impunity, but doses of 0.02 Gm. are extremely active when administered subcutaneously.—Pharm. Journ., June 8, 1901, 724; from E. Merck's Ann. Rep. for 1900.

Glyconine is a new name for "Saccharine."

Gomenol is the trade name applied to the volatile oil (s. g. 0.922) of *Melaleuca viridiflora*. It is a natural terpinol, the odor and taste of which may be placed between those of camphor and peppermint. The oil exercises a favorable limiting influence upon the secretion in chronic bronchitis and tuberculosis of the lungs, and diminishes the intensity and duration of the attacks of coughing and vomiting in whooping cough, besides shortening the duration of the sickness. It may be applied by intramuscular injection, 1 part of gomenol being mixed with 4 parts of sterilized olive oil, or a similar solution may be applied in the form of an enema, the proportion of gomenol being increased to 50 per cent. in the case of children over two years of age.—Pharm. Journ, June 8, 1901, 724; from E. Merck's Ann. Rep. for 1900.

Guacamphol is the name given to the camphoric acid ester of guaiacol. It is a white, tasteless and odorless powder, insoluble in water and other ordinary solvents, not affected by the gastric juice, but capable of decomposition into camphoric acid and guaiacol by the alkaline secretion of the intestine. Doses of 0.2 to 1.0 Gm. have been administered in cases of

phthisis, as a means of checking nocturnal sweating. Pharm. Journ., June 8, 1901, 724; from E. Merck's Ann. Rep. for 1900.

Guajakinol is the name given by J. Castel to the dibromguaiacolate of quinine, the formula he has now established to be as follows: $C_{20}H_{24}N_2O_2 \cdot 2HBr.C_6H_4OH.OCH_3$. The compound therefore contains 48.79 per cent. of quinine and 18.07 crystallizable guaiacol. It is not only easily soluble, but hygroscopic, and has been recommended, by reason of its ready solubility, as a serviceable medium for the internal exhibition of its active components, while, externally, it finds useful application in erysipelas, etc., in form of oil solution.—Pharm. Ztg., Jan. 9, 1900, 29; from L'Union Pharm., 1900, No. 12.

Haemoform is the name given by Libbertz to a preparation from blood. It is supplied in form of a red-brown, shining powder, which under the microscope is shown to be composed of uniform, pale blood-red scales. It is soluble in water, forming a clear brown solution, appearing red by transmitted light, which is both odorless and tasteless, has a neutral reaction, and gives the spectrum of methaemoglobin. The preparation is also supplied in liquid form.—Pharm. Ztg., Nov. 17, 1900, 889.

Haemoform, according to Fresenius, is a stable and pleasant-tasting "haematogen" preparation. According to his analysis, the haematogen used for this preparation is composed almost exclusively of the albuminoid bodies of blood, hence very rich in nitrogen, relatively so in iron, in organic combination, and easily digested, and therefore a nutrient which seems particularly well suited to introduce blood-producing substances in active form into the human organism.—Pharm. Ztg., June 15, 1901, 482.

Haemogallol is recommended as a blood forming agent, particularly adapted for children, in doses of 5 to 20 Cgm. per day. It is given mixed with a little water.—Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Haimose is the name given by Dr. Hermann Stern to a preparation of blood, prepared at the ordinary room temperature, and represented to contain the blood constituents—albuminoids, ferments, and salts—in a practically unchanged condition. It is claimed to have the effect of forming blood, increasing the appetite, and promoting digestion, in a high degree.—Pharm. Ztg., Mar. 20, 1901, 235.

Heliosin is the name given to a sterilized extract of the keratogen substances. The preparation is injected into the subcutaneous tissue of the back and the gluteal region, in certain syphilitic affections.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Hetocresol is the name given to a compound of "hetol" (which see below) with cresol. It has been employed in urogenital and glandular tuberculosis, in conjunction with intravenous injections of hetol. A solution containing 1.5 per cent. of hetocresol and 0.7 per cent. of common

salt, is used for washing the bladder, after cocainization, while fistulous tracts occurring in tuberculosis of the sexual organs are injected with hetocresol-iodoform (2 : 1 or 1 : 1 per 8 parts of water), or hetocresol-iodol-ether (2 : 1 per 7 parts of ether).—Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Hetoform is the name given by Lolke to "bismuth cinnamate," obtained by the reaction between crystallized bismuth nitrate and sodium cinnamate. It has the composition $Bi(C_9H_7O_2)_3.Bi_2O_3$, and constitutes a white powder having a cinnamon-like odor. No mention is made of its therapeutic value.—Pharm. Ztg., Feb. 13, 1901, 131; from Pharm. Weekbl., 1901, No. 5.

Hetol is the name given to "sodium cinnamate." It is recommended as a remedy in tuberculosis, being used subcutaneously in doses of 0.0005 to 0.005 Gm.—Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Honthin (see Proceedings, 1900, 552) is the name given to a "keratinated tannate of albumen" which, according to Dr. F. Kölbl, possesses the advantage over tannalbin in that it is much less soluble in the gastric juice. While only 41.5 per cent. of tannalbin passes undecomposed into the intestinal tract, 72.1 per cent. of honthin reaches the intestines in an unchanged condition. He considers it a superior intestinal astringent which may be given to infants in doses of 0.3 to 0.5 Gm. five times daily, while adults may be given 1.0 to 2.0 Gm. a dose at the same intervals. Honthin is supplied in the form of a grey-brown odorless and tasteless powder, insoluble in water, but partially soluble in alcohol and in alkaline solutions, the alcohol apparently dissolving only the tannin.—Apoth. Ztg., July 4, 1900, 456; from Wien. Klin. Rundsch., 1900, 496.

Hyrgol (Colloidal Mercury) has been recommended in cases of papulous eruptions, syphilitic affections of the lungs, teeth, etc. It is taken internally in the form of a powder or pills, 0.05 Gm. being administered daily; externally, it is used in the form of 10 to 33 per cent. ointments.—Pharm. Jour., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Ichthoform is the name given to a compound obtained by the action of formaldehyde upon the products of sulphonization of hydrogen sulphide. It is a comparatively innocuous antiseptic, possessing a higher disinfecting power than iodoform and analogous agents. It has been recommended as a substitute for iodoform in the external treatment of wounds, but may also be administered internally, the dose for adults being 1.0 to 2.0 Gm., and for children 0.25 to 0.5 Gm. three or four times daily.—Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Ichthyodine is said to be a product of the crude oil from which ichthyol is prepared, freed from the sulphonates and light oils that accompany the crude product.—Pharm. Ztg., Sept. 29, 1900, 759.

Ichthyol Specialties.—Ichthyol has been shown to be absorbed through the normal skin of the dog. It has also been administered internally, in various gynæcological affections of an inflammatory nature, 1 to 3 pills containing 0.2 Gm. being given daily. In dysentery, an enema of 800 Cc. of a 3 per cent. solution has produced favorable results, and in scarlatina inunction of the entire surface of the body with a 5 per cent. ichthyol-lanolin ointment has dispelled swelling and itching of the skin. A 5 per cent. solution of ichthyol has also been used as a nasal douche in scarlatinal pharyngitis, and inunction with 10 per cent. ichthyol-vasogen has been employed in diseases of the joints. Among the ichthyol specialties that have attracted attention, "ichthalbin" and "ichthargan" may be mentioned.

Ichthalbin is a new ichthyol compound, which is given as a tonic in daily doses of 0.3 to 0.5 Gm. In chronic intestinal catarrh in children under one year, 0.2 to 0.5 Gm. has been given three times daily, from 0.5 to 1.0 Gm. being given above that age.

Ichthargan is a compound of ichthyol-sulphonic acid and silver, containing 30 per cent. of the metal. It is a stable, brown, amorphous, odorless powder, readily and completely soluble in water, glycerin, or dilute spirit, but insoluble in strong alcohol, ether or chloroform. As the aqueous solution darkens when exposed to the action of light, it should be kept in amber-colored bottles. The compound is employed as an antiseptic in the treatment of gonorrhœa, 0.02 to 0.2 per cent. aqueous solutions being used as injections, or 0.025 to 0.05 per cent. solutions as douches. —Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Iodipin is the trade name given to a compound which is claimed to be capable of replacing the iodides as a specific for syphilis, and is recommended for use wherever iodine compounds are indicated for local or general action, as in asthma, angina pectoris, etc. — Pharm. Journ., June 8, 1901, 725; from E. Merck's Ann. Rep. for 1900.

Iodol, which has been known for a number of years, is stated in E. Merck's Annual Report for 1900, to have largely replaced the iodides in the internal, and iodoform in the external, treatment of laryngology. The iodol is made into pills containing a grain and a half, with liquorice extract, two pills being taken morning and evening; the daily dose is increased to six pills after the lapse of three days, and then gradually increased to ten pills. In the form of

Iodol Collodion (1 : 9) it is applied to erysipelas, while

Iodol-Menthol (99 : 1) is a non-irritant application in diseases of the nose, throat and larynx.—Pharm. Jour., June 8, 1901, 725.

Iodolene is the name given a new iodol and albumin compound, which occurs as an extremely fine, dry, yellow powder, devoid of odor or taste, and insoluble in ordinary liquids. It contains 36 per cent. of iodol, and is used as an antiseptic in place of iodoform.

Iodopyrine is described in "E. Merck's Annual Report," for 1900, as possessing eminent antifebrile, antirheumatic, and antineuralgic properties. It has been proved to retain its acivity undiminished even when used continuously for months. Antipyretic doses of 0.5 to 1.0 Gm. reduce the temperature one or two degrees in feverish conditions. — Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Jequiritol is the name given by Roemer to a perfectly-sterilized solution of "Abrin" (from *Abrus precatorius*). It is claimed to be a permanent product which retains its activity unimpaired, and is intended to replace the jequirity extractions commonly used in ophthalmic practice, but unsatisfactory because of their variable activity and instability. — Pharm. Ztg., March 13, 1901, 217.

Kalagaua is the name given to an extract prepared from a Colombian plant of the same name, and is recommended as a powerful promoter of the digestive function and of assimilation, being absorbed by the stomach without producing reaction. It is said to be particularly useful in the treatment of pulmonary tuberculosis, its beneficent effects manifesting themselves after a few days by increasing the general strength and the appetite, alleviating cough and causing the abatement of night sweats, etc. —Pharm. Ztg., Dec. 22, 1900, 988.

Kryofin is described in "E. Merck's Annual Report" for 1900, as a very efficient remedy in neuralgia and various kindred affections, also in syphilitic neuritis and meningitis, uræmic headache and dismennorrhœic pains. The dose is 0.5 Gm., taken dry, and washed down with a little water, the dose being repeated once or twice if necessary, after an interval of twenty minutes; or 1.0 Gm. may be taken at once.—Pharm. Journ., June 15, 1901, 754.

Largin, according to "E. Merck's Annual Report" for 1900, has again been shown to be of value as an antigonorrhœic, injections or douches being also found useful in cases of urethritis. Concentrated solutions of largin do not cause pain in ophthalmic surgery.—Pharm. Journ., June 15, 1901, 754.

Lien is the name given to an extract prepared from the spleen, which is used in cases of typhoid, malaria, influenza, and tuberculosis. See "*Splenic Extract*" (Animal Extract) under "Organic Chemistry."

Limanol is an extract obtained by boiling and expressing the deposits from the rivers emptying into the Black Sea, known as the "Liman-moor," near Odessa, to which, according to Prof. Charkero, chloroform, ammonia water, oil of turpentine, and spirit of soap are added for special purposes. The moor-extract enjoys a reputation as an efficient embrocation for the treatment of rheumatism, gout, etc., and the substance itself has enjoyed a similar reputation since the earliest times.—Pharm.

Liquor Thiophosphini is the name given by Dr. K. Aschoft to a solution

containing besides calcium compounds, potassium guaiacol sulphate as active constituent. The preparation has a pleasant taste and is given in doses of 5 to 10 Gm. in place of the well-known "Syrupus Guaiacolis," a preparation which has the disadvantage of an unpleasant guaiacol taste.—Pharm. Ztg., May 15, 1901, 394.

Lusiform is the name given to a new disinfectant which has the characters of a mild soap, is soluble in alcohol and in water in all proportions, producing with the latter frothing solutions, is non poisonous, and is in all respects the equal of "lysol." It contains fermol. Strassmann finds it a suitable antiseptic and disinfectant in gynæcological practice.—Pharm. Ztg., Jan. 9, 1901, 29.

Lygosin is the name given to "di-ortho-cumar-ketone." It is used in the form of sodium and quinine compounds. The latter is an amorphous orange powder, sparingly soluble in water, soluble in alcohol to the extent of 15 per cent., and to the extent of 5 per cent. in hot oil. It offers a special advantage for the preparation of dressings, since they can easily be impregnated with it, and it does not volatilize.

The sodium salt is a ruby colored compound, freely soluble in water, and has the power of lowering the temperature in healthy and feverish rabbits.—Pharm. Journ., June 15, 1901, 755; from E. Merck's Ann. Rep. for 1900.

Lysoform is the name given to a clear yellowish disinfecting fluid, in which the unpleasant odor of formaldehyde is masked by aromatic additions. The liquid is innocuous and mixes with water and alcohol in any desired proportion, 2 to 3 per cent. solutions being said to suffice for disinfecting the hands, whilst a 1 per cent. solution is recommended as a vaginal douche.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Maciin Pastilles, an anti-fat remedy, recommended also as a blood purifier, are stated to be composed essentially of iron lactate, quinine hydrochloride, potassium citrate, sodium sulphate, and guaiac resin.—Pharm. Ztg., Dec. 8, 1900, 951.

Melan is the name given to a remedy for wounds which is claimed to be prepared from a South American plant, *Melilotus coeruleus*. It is described as an oily plant, having a deep green to dark brown color, and an aromatic odor, and is employed either direct upon the bandaging or in the form of an ointment made with the addition of wax.—Pharm. Ztg., Nov. 28, 1900, 919; from Pharm. Rundschau.

Mentophor is the name given to a specialty which is essentially the well-known "menthol-inhaler," since it is described as a vial with openings at both ends, and filled with menthol crystals.—Pharm. Ztg., Dec. 22, 1900, 988.

Mercuralgam is a synonym for "mercuriol," the amalgam of aluminum

and magnesium, introduced recently under the latter name.—Pharm. Ztg., Oct. 20, 1900, 816.

Mercolint is the name given to ordinary cotton cloth impregnated with 90 per cent. mercury ointment, and cut into such shape that it can be worn upon the chest, with the object of producing the effect of a mild mercury treatment by the gradual evaporation of the mercury.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Mucin is a yellowish-green, tasteless, and odorless powder, derived chiefly from the bile and belonging to the series of glycoproteins or albuminoids. It is soluble in water and is administered in cases of gastric ulcer, in doses of 0.6 Gm., mixed with an equal quantity of sodium bicarbonate, with the object of protecting the corroded mucous coating from the evil effects arising from hyper-acidity and the introduction of food. The mixed powder is dispensed in wafers, and a dose should be taken at the beginning of each meal.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Musol is the name given by an enterprising German apothecary to cachets, lauded as a specific in diabetes; each cachet containing simply 1 Gm. of salol.—Pharm. Ztg., Mar. 6, 1901, 196.

Naftalan is the basis of numerous preparations, for which its name is generic, such as naftalan salve, naftalan adhesive plaster, naftalan soap, naftalan suppositories, etc.—Pharm. Ztg., Febr. 20, 1901, 156.

Nectrianin is an extract obtained from cultures of *Nectria ditissima*, an organism which gives rise to cancerous excrescences on forest and fruit trees. The preparation is said to possess analgetic properties far exceeding those of morphine, and it has been injected in cases of cancer, 3.0 Cc. being administered daily.—Pharm. Journ., June 15, 1901, 754; from E. Merck's Ann. Rep. for 1900.

Nioform is the name given by Tarel to "iodochloroxyquinolin," and is recommended as an excellent substitute for iodoform, possessing powerful bactericidal properties and being devoid of toxic action. It may also be used subcutaneously.—Pharm. Ztg., Feb. 13, 1901, 132; from Nouv. Rem., 1901, No. 2.

Orexine Tannate, according to "E. Merck's Annual Report" for 1900, is held to be equivalent, if not superior, to older orexine preparations, on account of its stimulating effect on the appetite. In doses of 0.3 to 0.5 Gm., once or twice daily, it does not give rise to any unpleasant secondary symptoms, can be taken without any envelope, and does not appear to decompose even when kept for a considerable period. The compound is recommended for incipient tuberculosis, anæmic conditions, and diminishing the secretion of hydrochloric acid; in repeated doses of 0.3 to 0.4 Gm. it also checks the obstinate vomiting in chloroform narcosis.—Pharm. Journ., June 15, 1901, 755.

Organic Silver Compounds—Enumeration of those Employed in Antiseptic Medication.—E. Hawkins, in a lengthy note, enumerates the following organic silver compounds employed in medicine: *Actol*, silver lactate; *itrol*, silver citrate; *collargol*, colloidal silver; *silberol*, silver sulphocarbolate; *argentamin*, ethylene diamine-silver-phosphate; *argentol*, silver quinseptolate; *argonin*, silver caseinate; *largin*, a silver compound with an albuminoid protalbin; *protargol*, a compound of silver, with a protein, and *nargol*, silver nucleide.—Pharm. Journ., Aug. 11, 1900, 209; from Therapist, *10*, 145.

Ossin is an emulsion of cod liver oil, prepared without gum, well sweetened, permanent, and easily miscible with water. Its taste is relatively pleasant.—Pharm. Ztg., Feb. 27, 1901, 176.

Ossorbin, a trade-named remedy against mouth and foot-rot, is said to have the following composition: Hexamethylpararosaniline citrate, 0.4 per cent.; ferric oxide, 0.3 per cent.; linden charcoal, 0.3 per cent.; fennel, 8.5 per cent.; foenigreek, 8.5 per cent.; thyme, 7 per cent.; English milk-fodder meal, 75 per cent.—Pharm. Ztg., Oct. 31, 1900, 843.

Ovarial is the name given to the powdered ovarian substance.—Pharm. Journ., June 22, 1901, 779; from E. Merck's Ann. Rep. for 1900.

Pankreon is the name given to a product obtained from the pancreatic secretion, which is claimed to possess the properties of the pancreatic ferment in a high degree. One gram is said to be capable of digesting 83 per cent. of the albumen if 100 grams of the latter are subjected to its action at 40° C., and it possesses, in addition, the well-known amylolytic power of the secretion as well as the property of splitting up fats. The dose recommended is 0.3 to 0.5 gram during or after meals.—Pharm. Ztg., Oct. 20, 1900, 816.

Pegnin is the name given to a rennet ferment which, it is claimed, renders cow's milk more digestible and approximates it more closely to mother's milk. The milk is first boiled, then reduced to the temperature of the body, and coagulated by means of pegnin. The coagulum is then easily minutely divided by shaking and twirling, so that the product has and retains the appearance and taste of ordinary cow's milk almost completely, and is quite as acceptable to the child fed upon it.—Pharm. Ztg., Jan. 9, 1901, 29; from Munch. Med. Wschr., No. 48.

Perdynamin is the trivial name recently given to the hæmaglobinalbuminate of Dr. Theurer.—Pharm. Ztg., Dec. 8, 1900, 951.

Persodine is stated to be composed practically of sodium persulphate, and is exhibited in France as a specialty for the treatment of tuberculosis. —Pharm. Ztg., Feb. 27, 1901, 176; from Repert. de Pharm., 1901, No. 2.

Pertussin.—C. N. Cocx recommends a syrup of thyme, prepared according to the following simple formula, as an efficient substitute for the

whooping cough remedy exploited under the name of pertussin: Infuse 50 Gm. of thyme in enough water to obtain 90 Gm. of infusion, in which dissolve 130 Gm. of sugar. It is believed to be identical with the basis of Tæschner's pertussin.—Pharm. Ztg., Feb. 27, 1901, 176.

Penol is the name proposed for a 25 per cent. solution in castor oil, or olive oil, of pure, synthetic "benzoic acid-benzyl ester," which, in turn, is marketed under the name of

Peruscabin. The latter is identical with the natural benzoic acid-benzyl ester in balsam of Peru (which see under "Materia Medica), of which it is regarded to be the principal active constituent.—Pharm. Ztg., Sept. 29, 1900, 759.

Phenolysolum Hungaricum, is the name given to a disinfectant prepared from cresylic acid, but otherwise of unknown composition. It is described as being an oily, dark-brown, somewhat reddish fluid, smelling strongly of cresol, unalterable in the air, and easily dissolved by water in all proportions. The preparation is, however, not devoid of toxic properties, and should therefore be used with the same precaution as lysol.—Pharm. Ztg., Oct. 21, 1900, 843; from Oester. Med.-Chirurg. Presse.

Pictolin is the name given to a liquefied gas, presumably a mixture of carbon dioxide, nitrogen and sulphur dioxide, recommended for the destruction of rats, mice, etc., in carefully-closed rooms.—Pharm. Ztg., April 27, 1901, 340; from Gehe & Co.'s Spring Report for 1901.

Pix Solubilis is a water-soluble preparation of tar obtained by the action of sulphuric acid upon wood-tar and subsequent washing with very weak solution of soda to remove the mineral acid. Its aqueous solution contains 20 per cent. of wood-tar and has a neutral reaction.—Pharm. Ztg., Nov. 28, 1900, 919.

Plantose is the name given by Fromm to a vegetable albumen obtained by extracting the press-cake of rape seed with water and coagulating the dissolved substance by heat. It is insoluble in water, of a yellow color' tasteless, and contains from 12 to 13 per cent. of nitrogen.—Pharm. Ztg., May 15, 1901, 394; from D. Med. Wschr.

Pneumin is the name given to "methylene creosote," while the name

Pulmoform is given to the corresponding "methylene guaiacol." They both posses the same general characters, being yellowish, odorless and tasteless powders, insoluble in water, but readily soluble in alcohol and ether. Silberstein has found these non-toxic preparations to yield good results in the treatment of various forms of tuberculosis.—Pharm. Ztg., Feb. 13, 1901, 132.

Purgatol is the name given to the "diacetyl ester of anthrapurpurin," which, according to Ewald, possesses the properties of an excellent, mild purgative, and the advantage of being absolutely tasteless and free from

unpleasant after effects. It is a yellow, crystalline, voluminous powder, insoluble in water and in acids, but soluble in dilute alkalies, producing a dark violet-red solution. The author has given it effectively in doses of 0.5 to 1.0 Gm.; but even 5 Gm. may be given without inconvenience, the excess being carried off with the faeces, since the splitting up of this body takes place slowly in the intestinal tract. A portion of the oxyanthraquinone is taken up by the urine and communicates to it a blood-red color.—Pharm. Ztg., May 15, 1901, 394; from Therap. Gegenw., 1901, 200.

Pyramidon Camphoricum is recommended as superior to antipyrine or pyramidon (dimethylamidoantipyrine) itself. Having the same effects as these, it is less toxic than antipyrine and does not cause the troublesome night-sweats observed when the other remedies mentioned are administered in tuberculosis cases. Pyramidon is capable of forming a neutral and an acid salt with camphoric acid, and it is the last-named that is under consideration. It constitutes water-soluble crystals, the dose being 1 Gm. daily.—Pharm. Ztg., May 22, 1901, 413; from Rép. de Pharm., 1901, No. 5.

Quinotropine is the name given to two compounds of urotropine and quinic acid, one containing 73 per cent. of the acid and 23 per cent. of urotropine, the other 80 per cent. and 20 per cent. respectively. It is freely soluble in water, and is recommended as a means of dividing uric acid at the body temperature, daily doses of 3.7 to 5.5 Gm. of the first (designated as I), and 5 to 7.5 Gm. of the second (= II). It may be given as lemonade by adding sugar.—Pharm. Ztg., May 25, 1901, 666; from E. Merck's Ann. Rep. for 1900.

Radal is the name given to a solution of protayol, 20 per cent. in water. It possesses powerful antiseptic properties and is a specific for the destruction of gonococci. It possesses the advantage over other prophylactics and gonorrhœa remedies that it produces no precipitates upon mucous membranes, and is therefore not rendered inactive, and that it is in general non-irritant and painless in its effects.—Pharm. Ztg., Feb. 13, 1901, 132.

Robol is the name given to a digestive compound recommended in the medical press as being particularly useful when albuminoid foods are employed. It is stated by the manufacturer to contain 0.2 per cent. of proteolytic ferments and 0.1 per cent. of amylolytic ferments in active form, in combination with 1.8 per cent. of inorganic salts (incl. of 1.0 per cent. calcium phosphate), about 65.0 per cent. of soluble extractive substances, free from nitrogen, 1.0 per cent. of nitrogenous substances, and small quantities of organic acids—the total acidity amounting to 0.25 per cent, calculated as citric acid. The preparation is also said to contain lecithin, traces of fat and water.—Pharm. Ztg., Oct. 31, 1900, 843.

Roborat is a nutrient compound prepared from grain. It is a whitish powder, odorless, and nearly tasteless—the somewhat bread-like taste being pleasant rather than otherwise—but may be almost completely masked when given in connection with milk or mucilaginous fluids, in chocolate, etc. According to E. Laves, this product contains about 95 per cent. of albuminoids, 2 per cent. of ether-soluble substances, 1.6 per cent. of ash, and only about 1 per cent. of starch and dextrin. When shaken with water, it froths like egg albumen, and forms a practically complete solution.—Pharm. Ztg., Oct. 2, 1900, 770; from Münch. Med. Wschr., 1900, No. 39.

Roborin is a preparation of blood, which is insoluble in water and almost tasteless, but almost completely soluble in artificial gastric juice. It is obtainable by a process of sterilization *in the cold;* indeed, throughout the process of its preparation, the temperature is controlled so as to avoid an excess of 50° C. According to the analysis of this new product, it is composed of 13.5 per cent. of salts, 80 per cent. of albuminoids, and 6.5 per cent. of water.—Phar. Ztg., Sept. 29, 1900, 759.

According to the analysis of Professor Kassner, roborin is composed of 76.9 per cent. of albuminoid substances, 4.58 per cent. of extractive, 7.49 per cent. of moisture, and 11.03 per cent. of inorganic substances (ash), 4.7 per cent. of the ash (calculated for the total substance) being Fe_2O_3, and present in a form in which it is readily dissolved by the digestive fluids, but not affected by the usual reagents.—Pharm. Ztg., Oct. 20, 1900, 816.

Sanatogen is the name given to a combination of casein and sodium glycerophosphate, which has recently been employed as a nutrient in mental cases, the daily dose being a teaspoonful and a half, while rickety children may be given doses of 10.0 to 30.0 Gm., according to age.—Pharm. Journ., June 15, 1901, 755; from E. Merck's Ann. Rep. for 1900.

Sapolan is a brownish-black ointment, consisting of 2.5 parts of fractionally distilled raw naphtha, 1.5 parts of lanolin, and 3 to 4 per cent. of anhydrous soap. It differs from tar preparations in not giving rise to a disturbing irritating action.—Pharm. Journ., 22, 1901, 779; from E. Merck's Ann. Rep. for 1900.

Sidonal is the name given to "piperazine quinate," a white powder, freely soluble in cold water, forming a solution with an acid taste, which can be made into a pleasant lemonade by the addition of syrup. It is reported as favorable in the treatment of uric acid diathesis.—Pharm. Ztg., May 25, 1901, 666; from E. Merck's Ann. Rep. for 1900.

Sidonal—Substitute.—C. Goldschmidt recommends a mixture of equal parts of kinic acid and piperidine tartrate as an efficient substitute for piperazine kinate, which is known by the trivial name of sidonal. Both kinic and tartaric acid have the property of reducing the formation of

uric acid, while piperidine urate is characterized by its free solubility in water. The toxity of piperidine is so slight that it may be disregarded, producing nausea and diarrhœa only when taken in larger quantities. At all events, it is the opinion of the author that the proposed substitute will prove quite as efficient as a gout remedy as the proprietary preparation sidonal.—Pharm. Ztg., Sept. 29, 1900, 759; from Chem. Ztg., 1900, No. 77.

Sitogen is the name given to a preparation obtained from brewer's yeast, which in appearance, odor, taste and chemical composition is very similar to the "meat extracts" of commerce.—Pharm. Ztg., April 27, 1901, 340; from Gehe & Co.'s Spring-Report for 1901.

Stomatol is the name given to an antiseptic, which, according to a recent analysis, is apparently a solution of terpin hydrate in a liquid composed of 2 per cent. of peppermint oil, 70 per cent. of alcohol, and 28 per cent. of water. It has a faint alkaline reaction. It is recommended particularly as a disinfectant mouth-wash.—Pharm. Ztg., June 15, 1901, 482.

Suppositoria Analia are suppositories composed of fat, oil and glycerin —quality or proportions not given—which are recommended for the relief of habitual constipation.—Pharm. Ztg., June 15, 1901, 482.

Suprarenine is the name given to a pyro-catechinoid substance discovered in the suprarenal gland. It differs from epinephrine. In this connection it is interesting to note that

Suprarenal Gland (powder and extract) is used in an increasing degree, having been recommended for use in hay fever (internally, 0.3 Gm. of the powder every two hours, and, externally, as a 6 to 12 per cent. aqueous solution of the extract applied as a spray), also in asthma, epistaxis, Addison's disease, rickets, and as an adjuvant in cocaine anæsthesia in operations on the larynx.— Pharm. Journ., June 15, 1901, 755; from E. Merck's Rep. for 1900.

Tegment is the name given to a new form of plaster which consists of a thin film of agar covering a delicate woven fabric, the agar film, in turn, being covered with a layer of glycerin-gelatine containing chinosol. This simple form of "tegment" is used as a covering for wounds and for bandaging—but other medicated forms are supplied—such containing xeroform, iodoform, airol, zinc oxide, aluminum acetate, etc.—Phar. Ztg. Dec. 22, 1900, 988.

Thiocol-Serum is the name given to a compound of thiocol and the serum of blood, which is claimed to unite the tonic and roborant effects of the two substances. It is administered in form of rectal infusion, in in which form blood serum has moderately been employed effectively in cases of general debility resulting from chronic ailments, or in reconvalescence after severe, acute sickness.—Pharm. Ztg., Mar. 13, 1901, 217.

Thiopyrine (Thioantipyrine—$C_{10}H_{12}N_2S$)—*Formation and Characters.*—

According to A. Michaelis and H. Bindewalda, thioantipyrine—for which the name of thiopyrine is proposed—is produced, as antipyrine is produced by the action of alcoholic alkali upon the chlormethylate of phenyl-methyl-chlorparazol, by substituting an alcoholic solution of potassium sulphydrate for that of the alkali. Thiopyrine occurs in form of colorless, well-formed, tabular crystals, melting at 166° C., moderately readily soluble in cold water, easily dissolved in hot water and alcohol. In ether it is sparingly soluble.—Pharm. Ztg., Nov. 28, 1900, 919.

Thymatol is the name given to "thymol carbonate" by J. F. Pool, who states that it is obtained by the action of phosgen gas on sodium thymolate. It is described as being a white crystalline body, having only a faint odor of thymol and a neutral reaction, melting at about 49° C. and boiling above 400° C. By alcoholic potash it is split into thymol and carbonic dioxide, but it is not affected either by dilute aqueous potassium hydrate nor by acids or the gastric fluid; nevertheless, it seems probable that it undergoes decomposition in the intestinal tract, inasmuch as it has proved to be a certain and safe anthelmintic and taenicide. It is given to adults in doses of 2 Gm., 3 to 4 times daily; to children, at the same intervals, in does of 0.5 to 1 Gm.—Pharm. Ztg., Jan. 16, 1901, 50; from Pharm. Weekbl., 1901, No. 1.

Triferrin is the name given by E. Salkowski to a preparation obtained by digesting cow's milk casein with pepsin and precipitating the solution —which contains phosphorus — by the addition of a ferric salt. The new substance is the ferric salt of a para-neuclinic acid, and contains, besides 22 per cent. of iron, 9 per cent. of nitrogen and 2.5 per cent. of phosphorus. When administered to animals it produced a marked increase of the iron in their organs. Administered to man, the results of Klemperer indicate that it is the equal of the best iron preparations now in use, and devoid of gastric disturbances.—Pharm. Ztg., April 17, 1901, 316; from Therap. Gegw., 1901, 191.

Uresin (not to be confounded with "Urosin") is the name given to the double citrate of urotropin and lithium. It is a white crystalline powder, easily soluble in water, and is recommended as an efficient antilithic. Kudintscheff has found it very efficient for removing the uric acid deposits in the bladder, and it is also claimed to be efficient in reducing the amount of uric acid in the urine.—Pharm. Ztg., Feb. 13, 1901, 132.

Validolum Camphoratum is a 10 per cent. solution of camphor in "validol" (a compound of menthol and valerianic acid), which is recommended by Ritter as an excellent tooth-ache remedy—being introduced into the cavity on cotton in the usual manner.—Pharm. Ztg., Jan. 9, 1901, 29.

Vaselinum Adustum Saponatum is recommended by Unna as a substitute for "Naftalan." It is composed of vaselin and sodium stearate.——Pharm. Ztg., Sept. 29, 1900, 759.

Vasolimenta is the name given by Dr. C. Bedall to a series of salve-like mixtures proposed by G. Roch (see below) to replace a similar series of compounds known by the name of "Vasogen." These compounds are both liquid and semi solid, and are designated respectively as "vasolimentum" and "vasolimentum spissum."

Vasolimentum is prepared by adding to 50 Gm. of olein, 25 Gm. of alcoholic ammonia, and heating this mixture with 100 Gm. of liquid paraffin until solution is effected, sufficient alcohol being added finally to restore the weight (when cold) to 175 Gm.

Vasolimentum spissum is prepared by substituting 100 Gm. of paraffin ointment for liquid paraffin, in the above formula, which is further modified by continuing the heat until the alcohol is evaporated.

Various combinations are effected by incorporating with one or the other of the above bases such medicaments as naphthol, guaiacol, mercury, iodine, creosote, ichthyol, creolin, salicylic acid, etc.—Pharm. Ztg., Dec. 8, 1900, 951.

Vasogen—What is it?—G. Roch observes that just as other substances that are by themselves insoluble in water may be converted into soluble or emulsifiable compounds by means of soap, so it is possible by means of ammonium soaps to convert paraffin oils, petrolatum, etc., into compounds which will readily mix with water. If a mixture composed of 100 Gm. of liquid paraffin or vaselin and 50 Gm. of olein (the oleic acid of commerce) is heated with 25 Gm. each of solution of ammonia and of alcohol, adding finally a little more alcohol, if necessary, a clear, light yellow oil is produced, which readily forms a permanent emulsion with water, and produces clear mixtures with chloroform, oil of turpentine, creosote, etc. It is a solvent also for iodine (under addition of a little chloroform), iodoform, camphor, and other substances. With vaselin and similar petrolatum, salve-like compounds may be produced in the same way, having the same properties as the compound obtained with the liquid petrolatum. These products possess great similarity in every respect to the liquid and solid products marketed under the name of "vasogen," but the author is not prepared to say that they are absolutely identical with the latter.—Pharm. Centralh., Oct. 18, 1900, 631.

Oxygenated Petrolatum—A Substitute for Vasogen.—M. I. Wilbert, referring to the above paper of Roch on a possible substitute for the proprietary article known as "vasogen," observes that a preparation of this kind offers so many possibilities for practical application that he was induced to experiment with the view to still further simplify the formula given by Roch, so as to avoid, if possible, the rather tedious process of boiling. He finds the following formula to answer well: Liquid paraffin, 100; oleic acid, 50; spirit of ammonia, U. S. P., 25. Mix. The resulting yellow oily liquid readily dissolves iodine, salol, salicylic acid, and

many of the alkaloids, mixes readily with chloroform and the essential oils, and makes a stable emulsion with water in almost any proportion. The alcohol remaining in the preparation does not seem to be a disadvantage, or to interfere with the properties of the compound, for which he proposes, in conformity with the practice of the German Hospital, to give brief titles to compounded preparations, the name

"*Petrox*." This may also be produced in a solid form, to be used as an ointment base, by substituting a hard petrolatum for the liquid. In this case the petrolatum is first melted, the oleic acid is added, and just before the mixture has cooled sufficiently to set, the spirit of ammonia is added while stirring, and the stirring continued until cold. The author points out a variety of uses for these bases, which possess the advantage over fatty bases in that they are easily removed by washing, while its usefulness has been demonstrated as a simple lubricant as well as a vehicle that promotes the absorption of many medicinal compounds when applied to the skin or to mucous membranes. Over "vasogen" it possesses the advantage of inexpensiveness, the proprietary preparation being held at prices which are almost prohibitory.—Amer. Journ. Pharm., May, 1901, 220–222.

Vial's Tonic Wine (*Vin de Vial*) is stated to contain, as essential components, calcium lactophosphate, meat juice, and extract of crown (cinchona) bark. It is described as a pleasant, invigorating beverage.—Pharm. Ztg., June 15, 1901, 482.

Vioform is the trade name given to "iodochloroxyquinolin," which, according to Tavel and Tomaski is not only the best substitute for iodoform, but has proven superior in the comparative bacteriological experiments made. It is free from toxity, may be injected subcutaneously in large doses, and has given very satisfactory clinical results.—Phar. Ztg., July 25, 1900, 569.

Viscin is the name given to a syrupy liquid, containing the purified bird lime, obtained from the berries and bark of *Viscum album*, dissolved in "benzine." The solution has a green color, owing to the presence of chlorophyll, and is strongly adhesive. As a basis for plasters, 1,500.0 Gm. of viscin solution is mixed with 100.0 Gm. of powdered orris, 400.0 Gm. of starch, 280.0 Gm. of Venice turpentine, and 30.0 Gm. of dammar resin; this mixture is reduced to a paste by evaporation, and the product medicated as required, with iodoform, zinc oxide, chrysarobin, pyrogallol, sulphur, etc.—Pharm. Journ., June 22, 1901, 779: from E. Merck's Ann. Rep. for 1900.

Vivien's Cod Liver Oil Preparations are marketed in form of wine, dragées and capsules, containing an extract of cod livers, the composition of which is indicated by the following published composition of the wine: Ichthyoglucin, 1.66; tropylamine, 0.085; acetic, butyric and lactic acid, together, 0.2; phosphorus (as phosphoric acid), 0.069; sulphur (as sul-

phuric acid), 0.007; iodine, 0.0018; chlorine and bromine, together, 0.051; alkali, 0.170; organic extract, 0.354; water, 0.720; wine, 320.0. Pharm. Zeitg., Jan. 16, 1901, 54.

Zomol is the name given to an inspissated meat juice, prepared at two temperatures, which forms small, flesh-red scales, nearly perfectly soluble in water, and quite hygroscopic. It is given in water, milk or bouillon, and has been found serviceable in the treatment of tuberculosis.—Pharm. Ztg., Mar. 30, 1901, 264; from L'Union Pharm., 1901, 203.

MATERIA MEDICA.

A. Vegetable Drugs.

GENERAL SUBJECTS.

Southern Plants—Notes on Isolated Instances of Northern Extension.—Referring to Prof. Cheney's note on the occurrence of the red mulberry (see *Morus rubra*, under "Urticacea"), L. H. Pammel observes that he met with an isolated tree in Minnesota, near the Iowa line, on the banks of the Mississippi, and that he should not be at all surprised to find that this species occurred also on the Wisconsin side above Prairie du Chien. Of other plants growing in these northern latitudes he mentions *Gymnocladus canadensis*, which he found in the vicinity of Stoddard, about eight miles below La Crosse, on the Wisconsin side. A specifically southern plant, the pawpaw, *Asimina triloba*, has been found as far north as McGregor, in Iowa, and the author found quite a patch a few miles north of Dubuque, at Specht's Ferry. Another southern plant that finds its way north of the limits usually ascribed to it is the pecan, *Carya olivaeformis*, which was reported to him from an island in the Mississippi north of Clinton, and has previously been reported from Davenport, Iowa, and Rock Island, Illinois.—Pharm. Rev., April, 1901, 156.

Indian Drugs—List of Such of Possible Value in European Practice.—William Mair contributes some notes on indigenous drugs in actual use by native and European physicians in British India, which are likely to be of practical utility in European medicine, and calls particular attention to the following:

Andrographis Paniculata. The dried herb of the "kreat" is a simple bitters useful in addition to chiretta, over which it possesses the advantage of having febrifuge properties. It is best prescribed as fluid extract.

Belæ Fructus, has been known in England and found wanting. It is

nevertheless the most trusted of Indian indigenous medicines, constantly prescribed by European physicians, and of unquestionable value in diarrhœa. An aqueous fluid extract from the pulp of the *fresh* half-ripe fruit, instead of the "imported dried slices," will redeem its character. The freshly imported whole roots only should be used.

Ispaghorla—the seeds of *Plantago ovata*—although containing no active principle whatever, are peculiarly successful as a remedy in diarrhœa and dysentery, and as an intestinal emollient in gastric catarrh. The action of these minute seeds appears to be purely mechanical; one drachm infused for 20 minutes in five ounces of cold water being given, without straining, as a draught.

Holarrhena Antidysenterica.—The root bark of this plant, called "kurchi," comes next to the bael fruit in the estimation of European practitioners in India. Its properties are mildly astringent, antidysenteric, and febrifuge. Preparation: a solid and a liquid extract.

Adhatoda Vasica.—The leaves are used in pulmonary affections, and regarded as an internal antiseptic in phthisis. Contain a white crystalline alkaloid, vasicine. The remedy is prescribed as syrup, which is best made from the liquid extract.

Carica Papaya.—The importance of the papaya fruit cannot be overestimated. An elegant "liquor papaïn," made from the fresh latex preserved in glycerin, is in vogue as a successful "vegetable papain."

Eugenia Jambolana.—If "jambol seeds" have not fulfilled all that was claimed for them, it remains to be proved that they are not useful in the treatment of diarrhœa. The secret of its usefulness may lie in making the aqueous liquid extract from *fresh* seeds from ripe fruit.

Garcinia Mangostana.—Mangosteen rind is popularly used like kino or catechu, in the form of a syrup made from the decoction. The syrup is perhaps improved if made from a fluid extract prepared with 20 per cent. alcohol.

Garcinia Odorata.—The value of the expressed oil from "Chaulmoogra seeds" in eczema, psoriasis, and allied skin affections, is well recognized. It is largely prescribed in India in the form of a cream, prepared with equal parts of the oil, lanolin, and lime water.—Trans. Brit. Pharm. Confer., 1900, 396–400.

Drug Culture—Desirability and Possible Necessity in the Future.—In a former paper entitled "In Lands Where Drugs Grow" (Amer. Jour. Pharm., April, 1900), F. B. Kilmer entered a plea for the publication of specific information as to the propagation, growth, collection and preparation of medicinal plants, having in view the highest conservation of their medicinal constituents, and of securing more uniform production, and especially the issuance, either by the government or otherwise, of bulletins containing information as to the best modes of cultivating, collecting and

preparing such medicinal plants as are suited to the climates of our States and Territories. That these appeals have not passed unheeded is evident from the interest now manifested in the subject of drug culture, and the author's present paper has been written with the purpose of stimulating efforts in this direction, and particularly the efforts of American pharmacists, by whom, after a careful review of the situation, it is evident to the author that the problem in the cultivation of medicinal plants can best be solved. For in this country we can call to our aid resources of a most extensive and varied soil and climate, and scientific agriculture here reaches the highest attainable point. Moreover, pharmacists can invoke the assistance of agricultural experimental stations; and, while the cultivation of good-sized plots in a variety of locations with records of soil, climate and results, may not prove immediately remunerative, it will furnish a vast amount of information and interest. As an easy and instructive experiment for the beginner, the author suggests the cultivation of certain alkaloidal plants which are indigenous — such as stramonium, hydrastis, etc.—with a view of obtaining records of assay of wild and cultivated drugs grown in the same locality. The present paper will prove very interesting not only to those who contemplate to profit by the hints given, but to those as well who are not so inclined or are not so situated as to engage in experimental cultivation. In a future paper, the author proposes to bring together notes of methods followed in the cultivation of certain medicinal plants which have come under the author's observation. —Amer. Journ. Pharm., Jan., 1901, 10–16.

Medicinal Plants—Experimental Cultivation.—Frederick T. Gordon communicates the results of some experiments made to determine the practicability of cultivating Belladonna, Hyoscyamus, Aconite and Carthamus from the seeds. In the case of

Belladonna he obtained after three months—when the experiments had to be discontinued—plants of sturdy growth, leaves of good color and appearance, and roots 10 to 17 inches long, from seeds believed to have been derived from selected English stock. With seeds of

Hyoscyamus, obtained from Mr. Lochman, of Bethlehem, Pa., he obtained hearty plants, which seemed to thrive even better than those of belladonna, and he expresses the opinion that both plants may be readily cultivated in his latitude (about Philadelphia ? Rep.) under judicious selection of locality and soil.

Carthamus also has done well under his cultivation, the only trouble being occasioned by the necessity of keeping the flowers picked fast enough to permit of a new growth. The average yield of dried petals from each flower was about 1 gramme, the product communicating a fine yellow color to water and to alcohol. With

Aconite his experiments with seeds obtained through the Department of

Agriculture were a failure. Not a single plant rooted, and the author believes that the tubers will have to be planted to get any growth.—Amer. Journ. Pharm., Nov., 1900, 534–535.

Medicinal and Culinary Herbs—Cultivation in Surrey, England.—In a paper on the cultivation of herbs in Surrey, E. L. Holmes enumerates those principally grown by Messrs. Potter and Clarke, well-known wholesale herbalists, in the endeavor to replace the more or less inferior imported herbs from Germany by such of more satisfactory quality. The medicinal herbs principally grown at present are pennyroyal, peppermint, hyssop, yarrow, mugwort, wormwood, tansy, feverfew, marshmallow, germander (*Teucrium chamædrys*), rue, lavender, balm, American golden rod (*Solidago*), comfrey, greater celandine (*Chelidonium majus*), southernwood (*Artemisia abrotænum*), stinking orache (*Chenopodium olidum*), and cotton lavender (*Santolina chamæcyparissus*). Small quantities of belladonna and henbane and savine are grown, and a notable quantity of *Datura tatula*, the purplish stems and lilac flowers of which were in excellent condition at the time of my visit early in August. The plants are grown in rows, with sufficient space between most of them to allow a little circulation of air between the separate plants when fully grown. In the case of chamomile and tansy and cotton lavender, the long ridges presented a mass of white or golden color that gave quite a pretty appearance to the fields.

The ordinary culinary herbs are also cultivated to a considerable extent for the purpose of preparing powdered flavoring herbs for winter use. These include parsley, spearmint, summer and winter savory (*Satureia hortensis* and *S. montana*), garden marjoram (*Origanum marjorana*), thyme, lemon thyme, tarragon (*Artemisia dracunculus*), and red and white sage.—Pharm. Journ., Aug. 18, 1900, 214.

Dr. Holmes has also had the opportunity to witness the *Cultivation of Medicinal Plants in Bedfordshire and Suffolk*, on the celebrated farms of the Messrs. Allen and Sons. At Steppingly, in Bedfordshire, where the soil is somewhat sandy, the plants chiefly cultivated are belladonna, lavender, henbane, black peppermint, and in lesser quantity, white peppermint, foxglove, and pennyroyal, while at Ampthill, where the soil is somewhat more loamy and moister, chiefly belladonna, aconite, rhubarb (*Rheum rapenticum* and *R. officinale*), opium poppy, squirting cucumber, lavender and conium are cultivated, and in lesser quantity, *Lactuca virosa*, *Rosa gallica*, rosemary, savine, and pennyroyal. In the richer and more loamy soil of the farm at Long Melford, in Suffolk, the plants cultivated flourish most luxuriantly. They include peppermint, henbane, poppies, dill and valerian. It is at this latter place where the works and stills of the Messrs. Allen are situated. They vary in size from 1000 gallons down, according to the needs in the distillation of essential oils. The oils chiefly made at present at Long Melford are those of sandal-wood, caraway, dill, cloves, lavender, peppermint, and orris root.—Pharm. Journ., Sept. 22, 1900, 338.

Pharmaceutical and Economic Plants of Jamaica.—Theo. H. Wardleworth briefly summarizes and comments upon some of the leading pharmaceutical and economic products of Jamaica which have recently come under his notice. Most of the plants mentioned flourish, grow freely, and may be cultivated profitably in different parts of the island. These plants and products are the following:

Annatto (*Bixa orellana*); kola (*Sterculia acuminata*); coca (*Erythroxylon coca*); oranges (*Citrus aurantium*, *Citrus vulgaris*, etc.); essential oil of limes; Jamaica dogwood (*Piscidia erythrina*); cowhage (*Mucuna pruriens*); balsam of Peru; balsam of tolu; pimento (*Pimenta officinalis*); papaw (*Carica papaya*); colocynth; ipecacuanha (*Cephaelis ipecacuanha*); cinchona; olives (*Olea europæa*); lemon grass oil; ginger grass oil; camphor (*Cinnamomum camphora*); castor oil plant (*Ricinus communis*); cardamoms (*Elettaria cardamomum*); ginger (*Zingiber officinalis*); vanilla; catechu (*Areca catechu*); cocoa-nut butter (*Cocos nucifera*); sarsaparilla (*Smilax officinalis*). The impression produced upon the author by his visit to Jamaica was, that with some slight measure of encouragement it would be possible to draw supplies of many drugs from Jamaica which at present come from other parts of the world in which the mother country has little or no interest.—Trans. Brit. Pharm. Conf., 1900, 421–427.

Vegetable Powders—Diagnostic Characters.—Prof. Henry G. Greenish and Eugène Collin have begun a series of papers on the diagnostic characters of vegetable powders, to which attention is here invited, so that they may be consulted in the original. The first paper (Pharm. Journ., March 9, 1901, 290–291) deals with the following starches: Wheat, rye, barley, maize, oats and rice; the second (Ibid., April 6, 1901, 424–425) with the starches of the potato, maranta, curcuma, tous les mois, British Guiana arrow root (*Dioscorea alba*, Linn.) and the banana, the distinctive characters of these starches being shown in excellent illustrations. The third paper (Ibid., June 15, 1901, 751–753) describes the flours of which some of these starches are characteristic components, viz., wheat flour, rye flour, barley flour, rice flour and maize flour, each subject being accompanied by an excellent cut showing the microscopic features that characterize it.

Powdered Drugs—Analytical Scheme for their Microscopical Examination.—In a series of papers running through the entire year's issue of Merck's Report, from July, 1900, to June, 1901, and then not completed, Burt E. Nelson describes an analytical scheme for the microscopical examination of powdered drugs, giving also the results of a large number of examinations, accompanied by illustrations showing the histological characteristics by which powdered drugs and their admixture may be identified, and following this up with an analytical key intended to aid such identification. He has endeavored throughout to make the work as practical as possible; physiological considerations, and anatomical structures which

are not of diagnostic value, have received little attention, however important they may be from the biological standpoint. The studies have mostly been made from powders of good quality, as they occur in the market. The illustrations, showing chiefly only the essential characteristics, are not intended to represent a single microscopical field, and are not drawn to a scale, as measurements are given in each case. The object of these studies will be plain to any one who has given the subject much attention. The majority of drugs which are especially active medicinally, are to-day seldom seen by the pharmacist in an entire condition, and adulterations and sophistications which would readily be detected by a careful observer, pass unnoticed when the drug is in the powdered form, except it be examined by powers higher than those of the unaided vision. A sufficient knowledge of the microscopic pharmacognosy of powdered drugs, to enable one to prove the identity of a single powder, is comparatively easy of attainment to one trained in this work, but the identification of a number of powders when mixed together is much like trying to bring order out of chaos, and is frequently impossible in the present state of our knowledge; but, by the exercise of untiring patience, the majority of even these may be separated into their different components. Again, in proving the identity of a single powder whose supposed name is known, one has only to compare the various anatomical elements of the powder with those of the test slide or drawing of the true substance; but when the powder is entirely unknown, some analytical scheme becomes necessary, and this the author has endeavored to supply, although it is only a tentative one and is intended to be filled in and remodeled as occasion requires.

Histological Tests of the B. P.—Bibliographical References a Desideratum.—E. M. Holmes is of the opinion that it would add considerably to the value of the histological tests of the B. P. for crude vegetable drugs and their powders if bibliographical references to reliable microscopic descriptions in published works were given. The fact that references to illustrations of plants are given appears to indicate that the compilers of the Pharmacopœia think that verbal descriptions alone are insufficient to determine the plants. Something similar is required in the case of the anatomical characters of drugs, as the brief descriptions of characteristic structures that it is possible to give in the Pharmacopœia are not always sufficient.—Pharm. Journ., Jan. 12, 1901, 30.

Crude Drugs—Removal of Fats as a Preliminary to Making Galenical Preparations From Them.—Francis Hemm calls attention to the advantages that result if the inert fixed oil or fat contained in drugs that are rich in them is removed before making the various galenical preparations —such as solid and fluid extracts, tinctures, &c.—from them. This is usually easily accomplished by some highly volatile solvent, such as ether or gasoline, which usually does not affect the active constituents of the

drug. The resultant preparation, if liquid, is characterized by being more permanent and sightly, while solid extracts can be concentrated to complete dryness.—Proc. Mo. Pharm. Assoc., 1900, 55.

Ash of B. P. Drugs—Determination in a Large Number.—C. G. Moor and Martin Priest communicate the results of ash determinations in a large number of drugs official in the B. P., made by themselves, and compared with published determinations made by others. These results show, what may be new to many, that considerable quantities of mineral matters are found in certain drugs. They also go to show that in several cases, for instance, in cardamoms and colocynth pulp, there should be some modification in the B. P. limits of ash. Furthermore, the authors believe that when a new Pharmacopœia is issued, the ash-limits can be considerably extended.—Trans. Brit. Pharm. Conf., 1900, 403–418.

Drug Adulterants—Detection by Means of the X-Rays.—M. I. Wilbert calls attention to the possibilities of the X-rays as a means of detecting certain adulterants in drugs, a proposition which has already received some attention, particularly in France. As is well understood, certain substances, notably those of mineral or metallic origin, are more or less opaque to the X rays, while others, of vegetable origin, for example, offer little or no resistance to these rays. Consequently we have in the X-rays a ready means of detecting the wilful or malicious admixture of the various substances that would ordinarily be used as adulterants of drugs of vegetable origin, such as clay, sand or gravel. The class of drugs that are especially adapted to this examination are such as have no organized cellular structure, like the inspissated juices, gums and resins, among which the author points out opium, asafetida, myrrh, aloes, scammony, acacia, etc., all of which are liable and known to be adulterated more or less by mineral or metallic substances. This mode of examination can also be applied to various substances used in the arts, such as coal, asphalt and other hydrocarbon compounds that have a more or less constant admixture of siliceous or earthy materials. The required technique is quite simple.—Amer. Jour. Pharm., Feb., 1901, 68–81.

BACILLARIÆ.

Bacteria—A Necessity of Certain Kinds to the Vital Processes in Animals.—According to Kijanizin, the presence of certain bacteria in the air is as necessary as oxygen for the continuance of vital processes in animals. He has found that when animals were confined for some days in a chamber of sterilized air, some died, others, although taken out alive, expired shortly afterwards, and all the rest which survived showed symptoms of extreme lassitude and weakness. These results were proved to be due neither to starvation nor to toxic exhalations, nor to the presence of CO_2 in the sterilized air. The urine excreted by the subjects was found to be abnormally rich in leucomaines, while the amount of urea present was very

low, showing that the processes of oxidation, which normally go on in the tissues, were materially retarded. He concludes that the oxidizing ferments which have been shown to be normally present in the tissues, are supplied by bacteria, which gain access to the blood, and probably to the leucocytes in the lungs. The actual cause of the debility and death in the animals experimented on is considered to be the enormous accumulation of insufficiently oxidized products which exercise a toxic influence. Bacteria are therefore considered to be essential for the maintenance of animal life.—Pharm. Journ., Nov. 17, 1900, 537; from Arch. d. Biolog. *16* 663.

Bacteria — Gases Produced During Their Growth. — W. C. C. Paker and W. H. Jollyman have described before the Chemical Society a new apparatus for the collection of the gases produced by bacteria when grown either under aerobic or anaerobic conditions. Experimenting with the *Bacillus pyocyaneus*, which is supposed to be a strictly aerobic organism, they found that it grew in media containing 1 per cent. of potassium or ammonium nitrate under the strictest anaerobic conditions, as the term is at present understood (that is, in the presence of hydrogen, or in the absence of any gas). They concluded, therefore, that the terms aerobic and anaerobic must be extended to include the presence of oxygen in the form of nitrates. Upon analyzing the gases produced by the organism from media containing nitrates, they found that both free oxygen and free nitrogen were evolved, the former in small quantities, but constantly.—Pharm. Journ., Dec. 15, 1900, 689.

Bacteria—Formation of Oxalic Acid by their Influence.—Experiments made by W. Zopf have determined that a number of acetic bacteria—*Bacterium aceti*, *B. acetigenum*, *B. acetosum*, *B. ascendens*, *B. kuetzingianum*, *B. pasteurianum*, and *B. xylinum*—have the property of converting racemic into oxalic acid. Minute crystals of calcium oxalate were always found when these bacteria were cultivated on a nutrient substratum consisting of 10 per cent. gelatin, 2 to 3 per cent. grape sugar, 1 per cent. peptone, and 1 per cent. extract of meat. When the grape sugar was omitted from the nutritive medium in control experiments, negative results were obtained.—Pharm. Journ., Sept. 29, 1900, 361; from Ber. D. Bot. Ges., 1900, 53.

Bacteria—Practical Points.—Frank R. Eldred read an interesting paper before the Indiana Pharmaceutical Association, in which he presented very lucidly some of the more important facts concerning bacteria and the methods of studying them. The paper cannot be profitably condensed, and must therefore be consulted in the original in Proc. Ind. Pharm. Assoc., 1900, 28–35.

Typhoid Bacillus—New Cultivating Medium.—L. Remy has devised a ew medium for the isolation of the typhoid bacillus from water, dejecta,

etc., which is prepared with the following ingredients: Asparagin, 6.0 Gm.; oxalic acid, 0.5 Gm.; lactic acid, 0.15 Gm.; citric acid, 0.15 Gm.; diodium phosphate, 5.0 Gm.; magnesium sulphate, 2.5 Gm.; potassium sulphate, 1.25 Gm.; sodium chloride, 2.0 Gm. The different salts and acids, with the exception of the magnesium sulphate, are rubbed together in a mortar, introduced into a flask with 1 liter of water, and 30 Gm. of Witte's peptone, and autoclaved for fifteen minutes. The mixture is then poured into a beaker containing 120–150 Gm. of gelatin, stirred until this is dissolved, and rendered slightly alkaline with caustic soda solution. It is then autoclaved at 110° C. for fifteen minutes, after which it is acidified with decinormal sulphuric acid to such an extent that 10 Cc. is just neutralized by 0.2 Cc. of a decinormal caustic soda solution. After shaking, the mixture is steamed for ten minutes and filtered. The acidity is then carefully controlled (for details see paper), after which the magnesium sulphate is added, and the whole is distributed into test-tubes (10 Cc. in each), and steamed on three successive days.—Pharm. Journ., Nov. 10, 1900, 511; from Ann. de 'l Inst. Pasteur, 14, 561.

Typhoid Bacillus — Distinction from Colon Bacillus. — Dr. William Hunter confirms the value of neutral red safranine as a reagent for the differentiation of cultures of *B. coli communis* from *B. typhosus*. The test was first suggested by Rothberger in 1898; its value as a reliable and rapid method of distinction between the two bacilli is fully borne out by the author. Although the test answers with most culture media, glucose agar, containing only a small amount (about 0.3 per cent.) of glucose, is preferable. The medium, before inoculation, is stained with a concentrated watery solution of the dye, in the proportion of 0.1 to 0.5 Cc. to every 10 Cc. When inoculated, either by stab or shake inoculations, and incubated, *B. coli communis* will discharge the color, producing a fine saffron tint with a marked fluorescence in twelve to twenty-four hours, while *B. typhosus* is without action on the red tint, under similar conditions. This is presumably due to the fact that *B. coli communis* is a powerful reducing agent, whereas *B. typhosus* has but feebly reducing powers. The reaction only succeeds in tube cultures; in plate cultures both bacilli behave alike. The so-called *B. enteritidis* of Gaertner also reduces the red color. It is, therefore, probably only a variety of *B. coli communis*.—Pharm. Journ., Mar. 30, 1901, 391; from Lancet, 160, 613.

FUNGI.

Aspergillus Niger—Characters of Proteolytic Constituents.—According to Dr. G. Malfitano, the diastase produced by *Aspergillus niger* is a protease, its properties being remarkably similar to those of papayin, and of the proteolytic enzyme of malt. It acts on gelatin, on the nucleo-albumins, on globulin, and on albuminates, but has no action on albumin itself; it does not digest the white of egg, differing in this respect from pepsin.

From papayin it differs only in a greater sensitiveness to the injurious action of the alkaline phosphates. From pancreatin it differs widely.—Pharm. Journ., Jan. 5, 1901, 5; from Annales Institut Pasteur, 14, 420.

Chinese Yeast—Botanical Relations.—The substance known as Chinese or Javanese yeast is largely used in eastern Asia for the fermentation of rice. The fungus which incites the fermentation has been made the type of an independent genus, *amylomyces;* but C. Wehmer shows that it is a true *mucor*, and names it *M. rouxii*. It ferments levulose, dextrose, galactose, sucrose, lactose, maltose and inulin, with production of alcohol. It is accompanied by another undescribed species of *mucor*, which also takes part in the fermentation of "ragi," and which he names *M. javanicus*.—Pharm. Journ., Jan. 19, 1901, 53; from Centralblatt f. Bacteriologie u. Parasitenkunde, 2te Abth.

Oidium Lactis—Characters as Found in Neuchatel Cheese.—Guilliermond describes in detail the mould which appears in Neuchatel cheese when fermented in the open air, and which he identifies provisionally with *Oidium lactis*. When cultivated in Pasteur's fluid, it produced both mycelial and yeast forms, but no ascigerous form was obtained. It inverts saccharose, but does not develop in lactose. All attempts to produce alcoholic fermentation with it failed. The cells contain a readily stainable nucleus.—Pharm. Journ., May 18, 1901, 617; from Rev. Gén. de Bot., *12*, 465.

Ustilagineæ—Growth Independent of Host-Plants.—G. Brefeld contests the ordinary view that the parasitism of the *Ustilagineæ* is obligatory. He has succeeded in growing several species of *Ustilago* quite independently of any host-plant; they thrive especially on the fæces of domestic animals, a point of great importance in the spread of smut and other diseases to which they give rise in cereal crops. In the case of most cereals there is only one period in which they are liable to the attacks of these parasites, viz., in the earliest stages of germination, when the tissues are very soft; after that they are exempt. Once having entered the plant the parasite will, however, find its way to the growing point and destroy the inflorescence. The smut of Indian corn, *Ustilago maydis*, exhibits somewhat different properties from those of other species, since it attacks not only young but also mature plants. By experiment the author has determined that the spread of smut is due to the power, not only of the conids, but also of the ustilagospores or smut-spores, to disseminate and multiply rapidly outside the host-plant.—Pharm. Journ., Jan. 5, 1901, 2; from Jahrber. Schles. Gesel. f. Agricult., 1900.

GRAMINACEÆ.

Arrhenatherum Bulbosum—Proximate Constituents.—V. Harlay has isolated from the bulbils at the base of the stems of *Arrhenatherum*

bulbosum, Gaud., a new carbohydrate, closely allied to the carbohydrates isolated by Eksland and Johanson from *Phleum pratense*, which he has named

Graminin. It was obtained from the cold water extract, after removing impurities with lead acetate, by precipitation with alcohol. It is a white soluble powder, which does not reduce Fehling's Solution, but reduces ammoniacal silver nitrate. Its aqueous solutions are precipitated by baryta water, but not by lime water. It melts at 212° C. The solution is lævogyre, the rotation being $[a]_D = -44.72°$. It is slowly hydrolized by heating at 100° in sealed tubes in neutral solutions, but rapidly under the same conditions with dilute H_2SO_4 with the formation of levulose. Saliva, diastase, and the juice of the young green shoots of the plant were without action on it, but the juice of the young white underground shoots had a marked hydrolytic action, and the ferment of *Aspergillus niger* has the same effect. The fresh bulbils were found to contain 7 per cent. of graminin, and 1.6 per cent. of reducing sugars, and 3.93 per cent. of albuminoids.—Pharm. Journ., April 27, 1901, 517; from Journ. de Pharm. [6], *13*, 353.

Malt—Confirmation of Proteolytic Ferment.—The presence of a proteolytic diastase in malt which has hitherto been assumed has now been experimentally determined by A. Fernbach and L. Hubert. It is comparable with the saccharifying diastase; but the result of its action is the formation of peptone instead of dextrin, and of amides instead of maltose. —Pharm. Journ., Sept. 1, 1900, 261; from Compt. rend., *130*, 1783.

PALMACEÆ.

Coconut Oil—Use as a Dietetic Article.—Coconut oil, which has been prepared on a large scale and in as refined a state as possible, has been introduced into the market in France under the name of

Végétaline by Roux, Tassy and Rocca. They point out that the agreeable flavor and nutty odor of the fat, together with its freedom from moisture and from fermentable nitrogenous matter, renders it especially suitable in cooking for the preparation of pastry and the like, in place of butter, oils and other fats that become rancid on exposure to air. This fat consists principally of laurin and olein, two glycerides that are easily digested and entirely assimulated, and possess the further advantage of moderate price.—Pharm. Journ., Oct. 20, 1900, 439; from Revue Cult. Colon., 7, 534.

LILIACEÆ.

Aloes—Reliable Distinctive Color Test.—E. Hirschsohn has reviewed the numerous color reactions that have been prepared for the identification and distinction of the different sorts of aloes, and finds the following to be the most reliable, but reliable only if applied to freshly prepared solutions or tinctures—failing when these have been made some months or exposed

to light. The sample is dissolved in water in the proportion of 1 : 1000. Then to 10 Cc. of the solution, 1 drop of cupric sulphate solution (1 : 10) and 1 drop of hydrogen peroxide are added. On boiling this an intense raspberry-red color is produced. In the case of Cape, hepatic, and some other varieties of aloes, the presence of alcohol, of inorganic acid, and of alkalies hinders the reactions, while acetic acid is without influence. If, instead of hydrogen peroxide, a drop of potassium ferricyanide solution 1 : 15 be employed, a brownish or raspberry-red color is given, and on boiling a precipitate is generally formed, and the supernatant liquid acquires a yellowish, or in the case of Curaçoa, Barbadoes, Zanzibar, and Natal aloes, a pinkish tinge. By substituting solution of potassium thiocyanate 1 : 15, or sodium nitro-prusside, Curaçoa and Barbadoes aloes give a red tint in the cold, which becomes more pronounced on heating. Both give a more or less red color with any of these reagents alone. Natal aloes give a red color on boiling with borax.—Pharm. Centralh., Jan. 31, 1901, 63.

Uganda Aloes—A New African Variety.—Cæsar & Loretz (Bericht, Sept., 1900) call attention to a new variety of aloes which has reached London during the year from Uganda. It proves to be of good quality, but has the external characters of hepatic aloes. Moreover, the high price asked prohibits its use in place of Cape aloes.—Pharm. Centralh., Oct. 18, 1900, 634.

Uganda Aloes—Absence of Aloin in a Sample Examined.—J. H. Evans, in view of the recent occurrence of Uganda aloes and sale at fairly high prices in the market, calls attention to an examination of a sample from which he draws conclusions that differ strikingly from those who have previously handled and examined this drug, and particularly those of E. M. Holmes, W. A. H. Naylor and J. J. Bryant. The sample examined by Mr. Evans yielded practically no aloin, but yielded 65 per cent. of matters soluble in water, yields a very fine powder, possessing a characteristic odor, and is particularly free from dirt. While in many respects it resembles the other varieties of aloes—Socotrine and Cape—in its solubilities, it is more like Barbadoes. In view of the absence of aloin in this variety of aloes, it would be interesting to see if Uganda aloes possesses the therapeutic properties of the other varieties.—Pharm. Journ., Nov. 24, 1900, 573.

Bulbine Aloides, L.—Proximate Constituents.—J. Gordon Sharp has subjected the root (bulbous ? Rep.) *of Bulbine aloides*, L. to proximate examination and finds it to contain: (1) Pyrocatechuic acid; (2) red-coloring astringent matter; (3) saline matter. The drug has a reputation in South Africa for rheumatism, and is there known by the name of "roode wortel," meaning red root.—Pharm. Journ., Dec. 22, 1900, 728.

Colchicum — Relative Alkaloidal Value of the Root and Seed. — Louis

Schulze communicates the details and results of some experiments undertaken in order to determine the relative alkaloidal value of the seeds and root of *Colchicum autumnale*, in order to ascertain the grounds on which the two and their respective preparations are retained as official in the Pharmacopœia. He finds that the seeds contain an average of 0.6 to 0.7 per cent. of alkaloid—the root only 0.4 to 0.5 per cent. Consequently, it appears that the seed, being the richer in alkaloid, should be retained, and the root, unless there is some other valid reason for retaining it, should be dismissed.—Proc. Md. Pharm. Assoc., 1900, 119.

Squill— Use of the Fresh Bulbs as Rat Poison.—Cæsar & Loretz (Bericht. Sept., 1900,) give the following method for preparing an efficient rat poison from the whole *fresh* bulbs of squill. The bulbs are chopped up as fine as possible, mixed with a small quantity of sausage meat and some flour, so as to make a dough, which is then fried so as to form small pan-cakes. These are covered with a little sugar, and are, so prepared, eaten by rats with great avidity, the animals dying very shortly after eating.—Pharm. Centralh., Oct. 18, 1900, 635.

BROMELIACEÆ.

Agaves—Cultivation and Economics.—Frederick L. Lewton gives an interesting review of the economic uses of the different species of *Agave*, indigenous to the arid regions of the North American continent, and describes the method and extent to which some of the species are cultivated in Mexico. Nearly all the agaves are natives of Mexico, Central America and the Southwestern United States, a few others being found in South America and the West Indies, while *Agave Americana*, the best known species, is cultivated along the Mediterranean, in India and in Africa. There are over 150 described species of agaves, about one-half of which are indigenous to Mexico, where they are known under the generic name of "maguey," and again divided into "pulque magueys" and "fibre magueys," in accordance with their economic use. Of these, the pulque magueys alone are cultivated, except in the state of Yucatan, the fibre maguey being seldom cultivated in the other states, the natives obtaining their supply of fibre from the wild species. The principal regions in Mexico for the cultivation of the pulque magueys are the arid limestone hills of the table lands. The young plants used in planting are the suckers, which are thrown out from the parent plant on all sides. They are placed in rows about 9 feet apart, and require very little attention until the period of flowering commences. Experience is necessary to know when to cut the flowers, because the transplanting of the numerous suckers must be made before this is done, and if this is too early or too late, it is unsuccessful and destroys the plant. The flow of sap, from which the beverage called pulque is made, continues for about five months, and in that time each plant is supposed to yield from 125 to 160 gallons of liquid.

The plants do not arrive at maturity before they are eight years old: consequently a long period must elapse before the plantation can be made productive. Under proper management, however, in a plantation of 1000 agaves an average of 100 plants are ready to bloom every year. The uses to which the agaves have been put are almost as extensive as those of the famous cocoanut palm. The sap, called "aguamiel," or honey water, is very sweet, and is much liked by the Mexicans and Indians. From this two kinds of beverages are prepared by fermentation, the principal one being the well-known "pulque." The other, which is obtained by distillation from the fermented sap of certain species of *Agave*, is a fiery liquor resembling strong rum, and variously called "aguardiente de maguey," "mezcal," and "tequila." The Indians of Arizona make mezcal from *Agave palmeri*, which, moreover, together with *A. applanata parryi*; and *A. Utahensis*, is also used extensive y by the Indians of the Southwestern States and Territories as food. Other economic uses of the plants or parts of them are: Soap substitutes from the leaves and roots, handles for lances, fishing poles, razor straps, walls for houses from the immense flower stalks, fodder for cattle from the leaves, &c. But the most profitable and extensive use is that of the leaf-fibre, which is used not alone for the production of ropes, twine, thread, sacks, hammocks, saddle-cloths, hats, baskets, brushes, paper, &c., for local consumption, but is exported from Mexico in large quantities—principally to the United States—where it is utilized in a variety of ways. The fibre that is produced and exported most extensively is the "Henequen" or "Sacci," and the "Sisal hemp" or "Gaxi," produced in Southern Mexico, whilst the "Tampico hemp" is shipped from Tampico on the Gulf Coast, but is not the product of agaves alone, being derived also from several species of *Yucca*. The "Ixtle fibre" is derived from the short-leaved agaves, whilst the "quapilla" is the fibre of the linear-leaved species.—Amer. Journ. Pharm., July, 1900, 327–334.

IRIDEACEÆ.

Hyacinth Bulbs—Irritant Effect on the Eyes.—Zeper calls attention to the irritation of the conjunctiva, often amounting to conjunctivitis, and to the severe itching of the hands and face, which attack the workmen employed on the large bulb farms in separating dried hyacinth bulbs in August and September. The author attributes this to the presence of an acarus which he considers may work its way under the skin, but he also mentions the fact that masses of brittle crystals are found on the bulbs, the cells of which are well known to contain many raphides, and it is possible that these entering the skin may give rise to the irritation described. — Pharm. Journ., Dec. 29, 1900, 153; from Klin. Monats. für Augenheilkunde, through Bost. Med. and Surg. Journ., 143, 570.

Saffron—Percentage of Ash. — Charles H. LaWall and Robt. C. Purcel

determined the ash in nine samples of Spanish saffron. The minimum was 4.57 per cent.; the maximum, 6.83 per cent.; the average, 5.80 per cent. Only one sample contained a preponderance of the yellow styles of the flower, possibly due to careless collection. — Proc. Pa. Pharm. Assoc., 1900, 161.

Saffron—Potassium Boro-Tartrate an Adulterant. — Francis Darls has determined the presence of potassium boro-tartrate in saffron. He has recently met with a specimen of this drug, which, although of good appearance and free from insoluble dressing, gave no less than 26 per cent. of ash. Further examination showed that the saffron had been moistened with a saturated solution of potassium boro-tartrate and dried. By adding this solution drop by drop to pure saffron heated on the water bath, it was found possible to increase its weight to the extent of 14 per cent. without materially altering its appearance.—Pharm. Journ., Jan. 5, 1901, 2; from Journ. Pharm. d'Anvers, 56, 417.

AMOMEACEÆ.

Cardamoms—A New Variety.—Dr. E. M. Holmes calls attention to a sample of a cardamom, recently sent from East Africa to England with a view to ascertain its medicinal value, which is apparently derived from a new species. In flavor it resembles the official cardamom and the Korarima cardamom, but differs from the former in having a large capsule about 2 inches long, and from the latter in its lesser diameter, and from both in having polished seeds about the size of those of *Cassia tora*, and, like them, somewhat angular. Further details are not as yet to hand, but specimens of the plant are promised for the Society's Herbarium.—Pharm. Journ., May 11, 1901, 595.

Cardamoms—Percentage of Ash.—Henry G. Greenish has determined the percentage of ash in twenty-three different samples of cardamom fruits, representing different varieties and qualities, and in six samples of different seeds, with results given in the appended tables, which exhibit also the average weight of the fruits, the relation in weight of the pericarp and seed, etc., specific details of the method of ascertaining their weights, and of determining the ash percentage being given.

From these results, which the author discusses at some length, he arrives at the conclusion that the ash of the seed does not furnish a satisfactory means of distinguishing the powdered seed from the powdered fruit, nor of distinguishing good qualities of seeds from bad ones. The amount of ash yielded by cardamom seeds permits of seeds of good quality being distinguished from many, but not from all, of inferior quality. But powdered seeds can be distinguished from powdered fruits with absolute certainty and infinitely greater ease by microscopical examination. The author describes the essential macroscopic characters that are required for this ex-

amination, the test being illustrated by a number of cuts, and submits the following description as probably sufficient to meet official requirements: "Powdered cardamom seeds, when examined under the microscope, should exhibit masses of thin-walled parenchymatous cells packed with minute starch grains; long, straight epidermal cells, with moderately thick walls and small polygonal, reddish-brown cells with very thick walls. It should be free from sclerenchymatous fibres or elongated cells, or small cells containing brown resin."

TABLE I.

CARDAMOM FRUITS.

AVERAGE WEIGHT OF FRUIT, PERICARP AND SEED.

VARIETY AND QUALITY.	Av. Wt. of Fruit.	Per cent. Pericarp.	Per cent. Seed.
Mysore (Ceylon):	Gm.		
1 Pale Bold	0.1625	34.8	65.2
2 Fine Pale	0.213	25.5	74.5
3 Good Pale	0.224	22.5	77.5
4 Pale not graded	0.131	29.7	70.3
5 Lean Brown	0.138	28.9	71.1
6 Lean	0.172	32.3	67.7
7 Brown Splits	0.152	33.8	66.2
8 Lean Splits	0.141	30.4	69.6
9 Poor Splits	0.128	25.4	74.6
Malabar (Ceylon):			
30 Very Fine	0.174	24.8	75.1
31 Good	0.131	23.8	76.2
13 Medium	0.171	25.4	74.6
14 Medium	0.119	30.7	69.3
15 Medium	0.147	28.5	71.5
12 Lean	0.126	25.4	74.6
11 Inferior	0.092	34.8	65.2
10 Very Inferior	0.048	52.6	47.4
Mangalore:			
17 Good	0.221	19.4	80.6
18 Good	0.192	19.2	80.8
16 Rather Small	0.148	21.7	78.3
Long Wild Natives:			
21 Good	0.581	22.7	77.3
20 Medium	0.543	26.4	73.6
19 Lean	0.339	39.2	60.8

TABLE II.

Cardamom Fruits.

PERCENTAGE OF ASH IN AIR-DRY PERICARP, SEED AND FRUIT.

Variety.	Pericarp.	Seed.	Fruit Calculated.	Excess Fruit over Seed.
Mysore (Ceylon):				
1 Pale Bold	8.81	4.31	5.88	1.57
2 Fine Pale	6.81	3.79	4.56	0.77
3 Good Pale	8.31	4.06	5.02	1.04
4 Pale not graded	9.75	5.01	6.43	1.42
5 Lean Brown	12.96	6.99	8.72	1.73
6 Lean	10.33	6.84	7.97	1.13
7 Brown Splits	10.52	3.53	5.90	2.37
8 Lean Splits	10.36	3.89	5.85	1.96
9 Poor Splits	9.25	4.36	5.60	1.24
Malabar (Ceylon):				
30 Very Fine	11.16	5.11	6.61	1.50
31 Good	12.25	5.54	7.15	1.61
13 Medium	12.90	6.27	7.95	1.68
14 "	12.01	7.68	9.01	1.33
15 "	12.58	7.57	9.00	1.43
12 Lean	12.11	5.71	7.34	1.63
11 Inferior	13.28	8.25	10.00	1.75
10 Very Inferior	14.59	13.87	14.25	0.38
Mangalore:				
17 Good	7.70	3.98	4.70	0.72
18 Good	7.60	5.51	4.30	0.79
16 Rather Small	14.37	6.20	8.04	1.84
Long Wild Natives:				
21 Good	16.07	6.31	8.53	2.22
20 Medium	13.67	7.53	9.15	1.62
19 Lean	12.88	8.61	10.01	1.40

TABLE III.

PERCENTAGE OF ASH FROM OFFICIAL QUALITIES.

No.	Seed.	Pericarp.	Fruit.	Fruit over Seed.
1 Mysore	4.31	8.81	5.88	1.57
2 "	3.79	6.81	4.56	0.77
3 "	4.06	8.31	5.02	1.04
4 "	5.01	9.75	6.43	1.42
30 Malabar	5.11	11.16	6.61	1.50
31 "	5.54	12.25	7.15	1.61
17 Mangalore	3.98	7.70	4.70	0.72
18 "	3.51	7.60	4.30	0.79
Summary.				
Average	4.41	9.05	5.58	1.17
Maximum	5.54	12.25	7.15	1.61
Minimum	3.51	6.81	4.30	0.72

TABLE IV.

PERCENTAGE OF ASH FROM UNOFFICIAL QUALITIES.

Variety.	Seed.	Pericarp.	Fruit.	Fruit over Seed.
Mysore 5	6.99	12.96	8.72	1.73
" 6	6.84	10.33	7.97	1.13
" 7	3.53	10.52	5.90	2.37
" 8	3.89	10.36	5.85	1.96
" 9	4.36	9.20	5.60	1.24
Malabar 13	6.27	12.90	7.95	1.68
" 14	7.68	12.01	9.01	1.33
" 15	7.57	12.58	9.00	1.43
" 12	5.71	12.11	7.34	1.63
" 11	8.25	13.28	10.00	1.75
" 10	13.87	14.59	14.25	0.38
Mangalore 16	6.20	14.37	8.04	1.84
Long Wild Natives 21	6.31	16.07	8.53	2.22
" " 20	7.53	13.67	9.15	1.62
" " 19	8.61	12.88	10.01	1.40
Summary.				
Maximum	13.87	16.07	14.25	2.37
Minimum	3.53	9.25	5.60	0.38
Average	6.91	12.46	8.48	1.57

TABLE V.

PERCENTAGE OF ASH IN CARDAMOM SEEDS.

No.	Quality.	Ash.
26	Good	4.93
27	"	5.70
28	"	7.71
29	"	7.32
24	Poor, deficient in aroma	8.1
25	Inferior	10.25

—Pharm. Journ., Mar. 2 and 30, 1901, 264–267 and 393–396.

Ginger.—Constituents of Various Commercial Sorts.—A. Russell Bennett has made an elaborate report of the examination of a large number of the commercial varities of ginger, both whole and in powder, giving his results in a series of six tables, here condensed into two, as follows:

JAMAICA GINGER.

Variety of Ginger.	No.	Color.	Total Ash.	Soluble.	Insoluble.	Moisture.	Cold Water Extract.	Approx. Volatile Oil.	Ether Extract.	Alcohol after Ether.	Resin Extract.
Jamaica whole.	1	Pale buff....	3.45	2.04	1.41	13.47	13.19	0.7	3.63	3.14	5.61
	2	Pale buff....	3.61	1.93	1.68	11.16	14.31	0.2	3.19	4.18	5.40
	3	Pale buff....	3.21	2.13	1.08	12.39	12.21	0.4	3.41	3.09	4.91
	4	Buff	3.30	2.09	1.21	10.43	13.18	0.3	2.57	4.15	3.94
	5	Buff	3.19	2.13	1.06	11.19	12.53	0.4	3.91	5.16	5.19
	6	Very pale buff.....	3.29	1.99	1.30	10.17	13.47	0.9	3.81	4.18	4.98
	7	Coated	4.15	2.16	1.99	10.61	9.43	0.4	6.41	3.41	4.80
	8	Very pale buff.....	3.18	2.13	1.05	11.71	11.19	0.7	3.71	3.87	5.16
	9	Coated	4.31	1.93	2.38	10.83	8.91	0.3	5.69	4.21	4.10
	10	Pale buff....	3.61	1.89	1.72	11.91	14.73	0.5	4.31	3.87	5.31
	11	Very pale buff.....	3.19	1.91	1.28	11.46	13.61	0.6	3.19	4.19	4.91
	12	Pale buff....	3.14	2.13	1.01	12.31	15.19	0.4	4.14	3.17	4.96
Jamaica ground.	1	Very pale buff.....	2.68	2.10	0.48	13.41	13.01	0.8	3.42	3.31	4.81
	2	Very pale buff.....	3.46	2.91	0.55	12.09	12.16	0.4	3.69	3.42	5.00
	3	Light brown.	3.19	2.84	0.35	10.16	15.01	1.2	2.97	3.01	5.01
	4	Very pale buff.... .	3.47	2.19	0.28	11.17	12.19	0.9	3.16	3.13	4.97
	5	Coarse fibre and pale buff.....	1.39	1.24	0.15	14.16	8.49	0.6	3.46	3.31	3.51
	6	Fibrous light brown....	2.99	1.01	0.98	15.01	7.01	0.7	4.12	4.01	4.67
	7	Pale buff....	3.16	1.74	1.42	11.19	13.65	0.5	4.11	3.96	5.67
	8	Buff.....	2.01	1.50	0.51	13.41	7.81	0.8	3.96	3.49	2.76
	9	Pale buff....	2.86	1.11	1.75	13.16	7.17	0.5	4.10	3.90	4.91
	10	Very pale buff.....	2.14	1.51	0.63	12.19	7.24	0.5	4.21	4.16	3.41
	11	Pale buff....	3.20	1.09	2.11	12.86	7.16	0.8	3.61	3.01	5.26
	12	Pale buff....	2.71	1.42	1.29	13.41	8.41	0.7	4.60	3.91	3.51

COCHIN AND AFRICAN GINGER.

Variety of Ginger.	No.	Color.	Ash.	Sol.	Insol.	Cold Water Extract.	Resin Extract.	Moisture.
Cochin Whole...	1	Very pale buff.	3.56	2.01	1.55	13.23	6.41	12.41
	2	Pale buff	3.41	1.94	1.47	12.19	5.95	11.98
	3	Buff	2.96	1.07	1.89	6.59	4.91	12.16
	4	Scraped.....	3.47	2.02	1.45	14.01	6.51	13.04
	5	Coated.....	4.21	3.02	1.19	11.46	6.74	10.98
	6	Coated.....	3.29	2.17	1.12	10.97	6.41	12.79
	7	Coated.	3.56	1.97	1.59	13.01	5.12	11.74
	8	Pale buff	3.17	1.56	1.61	8.31	6.42	10.09
	9	Pale buff	2.96	1.05	1.91	6.41	5.91	11.12

COCHIN AND AFRICAN GINGER.—*Continued.*

Variety of Ginger.	No.	Color.	Ash.	Sol.	Insol.	Cold Water Extract.	Resin Extract.	Moisture.
Cochin Ground ..	1	Buff	3.61	2.40	1.21	10.13	6.51	13.6
	2	Buff	2.14	0.7	2.07	7.21	5.96	12.01
	3	Light buff fibrous	2.01	0.5	1.96	6.95	5.71	11.19
	4	Buff	3.75	2.51	1.24	8.94	5.61	12.16
	5	Pale buff	3.85	2.45	1.40	11.45	6.49	13.13
	6	Buff	2.96	2.06	0.90	12.19	6.41	10.19
	7	Very pale buff.	3.19	2.39	0.80	11.14	5.91	13.14
	8	Very pale buff.	4.16	2.11	2.05	12.12	5.41	12.26
	9	——	2.06	0.3	2.03	10.13	5.41	13.09
African Whole ..	1	Dark brown ..	3.41	2.28	1.13	10.17	6.18	14.67
	2	Light brown..	3.27	2.14	1.13	11.14	6.30	15.19
	3	Light brown..	3.67	2.31	1.36	12.10	5.46	13.09
	4	Dark brown ..	3.68	2.21	1.47	13.14	5.96	12.16
	5	Light brown..	4.10	2.32	1.78	11.10	5.72	13.27
	6	Dark brown ..	3.19	2.27	0.92	12.12	6.61	14.19
African Ground..	1	Dark brown ..	2.21	1.56	0.65	7.16	4.57	15.17
	2	Dark brown ..	2.17	1.69	0.48	7.47	4.76	13.09
	3	Pale brown ...	3.47	2.16	1.31	10.74	6.47	14.17
	4	Pale brown ...	2.91	1.64	0.27	8.61	4.59	13.02
	5	Pale brown ...	2.19	1.79	0.40	7.46	5.14	12.17
	6	Pale brown ...	4.19	2.51	1.68	11.76	5.50	15.16

These results point out the possibility of determining the presence of exhausted ginger in the ground ginger of commerce by the ascertained amounts of the soluble ash and of the cold water extract, although neither of these data by themselves will answer this purpose. The author suggests that the B. P. authorities fix a standard for ginger somewhat after the following: To read consecutively with the characters already given in the Pharmacopœia "Should yield not less than 5 per cent. resin extract to 90 per cent. alcohol. Should yield not less than 1.5 per cent. of soluble ash when incinerated with free access of air, and not less than 8.5 per cent. of a cold water extract indicating absence of 'spent' or exhausted ginger."—Pharm. Journ., April 27, 1901, 522–524.

ORCHIDEACEÆ.

Vanilla—Cultivation in Ceylon.—E. H. Edwards, a practical vanilla planter, writing to the "Ceylon Observer," says that at the present price of vanilla its cultivation in Ceylon is most lucrative, but the plant is keenly susceptible to climatic influences in its cropping. An acre of vanilla, properly planted, can easily give 200 lbs. of prepared pods; its present market value in Mauritius is 19 r. per lb. In Madagascar, Bourbon,

Mauritius, and Seychelles, it is subject to a disease which sometimes completely wipes out the vanilleries; but the inhabitants are not disheartened: they open up and plant other lands—to replant on diseased land is useless. The market value of vanilla depends on the vanilla being gathered at the proper stage—almost to a single day—and on its preparation. The curing appears easy, and many a crop has been spoiled through a novice imagining he "knows all about it" after having seen a few hundred pods prepared. Only very careful observation and much practice will ensure satisfactory results.—Chem. & Drugg., Nov. 24, 1900, 865.

Vanilla — Different Methods of Curing.—I. C. Sawer gives precise details of the various processes of curing vanilla and preparing it for market. As is well known, the odor does not exist in the fruit as it is gathered, but is developed by a process of fermentation in the curing. Four methods are given: (1) The Guiana process: The beans are placed on ashes until they begin to shrivel; they are then wiped, rubbed over with olive oil, tied at their lower end, and dried in the open air. (2) The Peruvian process: The beans are dipped into boiling water, tied at the end, and hung in the open air to dry for twenty days. They are then smeared over with castor oil, and after a few days tied up into bundles. (3) Mexican process: The beans are placed in heaps, protected from sun and rain in a shed for a few days until they begin to shrivel. They are then "sweated," by exposing them to the sun, or to stove heat (60° C. the maximum), whereby they acquire a fine chestnut-brown color. The depth of color is proportional to the success of the operation. Finally, they are dried by exposure to the sun duirng a period of two months, and tied in small buudles for the market. (4) Réunion process: The beans are soaked in hot water, as by the Peruvian process, quickly dried in the sun for a few days, and then exposed for about a month to a current of hot air circulating in a zinc-roofed shed, which serves as a drying closet. When the beans can be easily twisted around the finger without cracking, they are put through the "smoothing process," which consists in passing each bean between the fingers several times, to impart lustre and suppleness, owing to the oil which exudes as the fermentation proceeds. Three commercial sorts are recognized: (1) Fine vanilla, 8 to 11 inches long, very dark-brown or nearly black, unctuous, glossy, clean-looking, and longitudinally furrowed. These soon become frosted with white crystals. (2) Woody vanilla, 6 to 8 inches long, lighter in color, more or less spotted with grey, not glossy. Tbese are generally the product of unripe pods. They frost, or "glore," as it is technically called, little, if at all. (3) Vanillons, of which there are two kinds, one obtained from short but ripe fruits, an excellent variety which frosts well, the other from unripe fruits, whose perfume is simply absorbed from fine beans by long contact. —Pharm. Journ., Aug. 11, 1901, 189; from Bull. Bot. Dept., Jamaica, 7, 45.

LAURACEÆ.

Camphor—Method of Extraction on Formosa.—A. Fischer, in a recent work, "Streifzüge durch Formosa" (Berlin, 1900), gives a short sketch of the commercial history of camphor, as well as a description of the method of extracting it on the island, as follows: "On a loam-built oven, some four feet high, for which wood is used as fuel, one or more iron vessels are placed, which are filled with water. On each of these vessels is placed a tubular wooden cylinder, about 5 feet high, the bottom of which is perforated so as to admit the water-vapor. These cylinders are filled with small pieces of camphor-wood, about 1¼ inches long by $\frac{3}{16}$ inches thick, fed in from the top; they are then covered over and plastered all round with loam to render them air-tight. The camphor-laden fumes are then drawn through a bamboo tube, about 11 feet long, which is fixed on the upper part of the cylinder, into a box-shaped air-tight receiver, some 6 feet high, placed in running water, in which the fumes are condensed in crystal-form. Another tube, slightly inclined downward, and placed at a somewhat higher elevation, admits water drop by drop into the vessel, to replace the evaporating liquid. This is essential, for the operation of distilling the pieces of wood is continued for 24 hours. It takes about a month to fill the receiver." The method of transporting the camphor from the still to the nearest port of shipment is described by the author as follows: "Hosts of male and female camphor-scented coolies—men and women dressed almost exactly alike—wearing hats of bamboo bark, trotted along in single file, the first indication that we were approaching the camphor-districts. The coolies came from a camphor-still; they carried the camphor or camphor-oil partly on poles, partly in tin cans, boxes or bags, to the nearest port or river for shipment. This groaning, perspiring mass of humanity, trotting along in a steady jog-trot, the bamboo poles, deflected under the load, beating time, diffused once more a stupefying odor. The carriers always remain anxiously together, forming caravans, in order to be secure against sudden attacks."—Schimmel's Rep., Oct., 1900, 12.

Cinnamon Bark—Adulteration With Guava Bark.—The "Svensk. Farm. Tidskr." calls attention to the following novel adulteration of stick cinnamon: The dried bark of the guava (*Psidium guajava*) is soaked in cinnamon water, dried, and both ends of the quill touched up with a little cinnamon oil, to impart the flavor and odor of cinnamon. The quills are then passed off as a substitute for cinnamon, or they are mixed with the true spice.—Pharm. Journ., Sept. 15, 1900, 313; from Oesterr. Ztschr. f. Pharm. *54*, 713.

MYRISTICACEÆ.

Nutmegs—Cultivation Experiments in Jamaica.—In the Annual Report of the Jamaica Botanic Gardens for 1900 it is stated that Mr. T. J.

Harris has succeeded in grafting female nutmegs on strong, healthy seedlings, so that the planter can now ensure all his trees bearing fruit. Hitherto nutmeg cultivation has not been popular in the island because, after having waited six or seven years for the trees to flower, the planters found that often two-thirds of them were male trees. The practical details of the process of grafting and subsequent treatment are given in the report. —Pharm. Journ., Aug. 25, 1900, 239.

Myristica Kinos — Description and Source of Two Varieties. — D. Hooper describes two varieties of liquid kino obtained from wild nutmeg trees in India. One, from

Myristica gibbosa, Hook. f. and T., can be used as a varnish, and, after evaporation to dryness, leaves a mass which resembles Malabar kino when coarsely powdered. It contains 33.6 per cent. of tannin (kino-tannic acid), is quite soluble in hot water, and practically so in rectified spirit, though some calcium acid tartrate is left undissolved in the latter case. The aqueous solution has an acid reaction, and is of a deep red color. The second liquid kino, from

Myristica kingii, Hook. f., leaves a mass which contains 30.2 per cent. of tannin, and in this case also calcium tartrate is present. It is thought that, if the fresh juices could be collected in quantity and evaporated without delay, the residue would be an admirable substitute for commercial kino.—Pharm. Journ., Sept. 1, 1900, 161; from Agricultural Ledger, No. 1900, p. 44.

POLYGONACEÆ.

Rhubarb—Chemistry.—In the course of some researches on rhubarb, undertaken for the purpose of investigating the cathartic principle, called cathartic acid, to which attention had been directed by A. B. Stevens in a paper read before this Association (see Proceedings, 1898, 337), Carl G. Hunkel found it desirable to become first familiar with the better-defined constituents of rhubarb, in the hope that a better insight into the nature of so-called cathartic acid might be obtained. These more or less characteristic principles are: Chrysophanic acid, methyl-chrysophanic acid, rhabarberon, emodin, rhein (Hesse), glucoside (Gibson), rheo-tannic acid and anhydrides, gallic acid, phenolic body, cathartic acid, phæoretin, erythroretin, aporetin, oxalic acid and oxalates. For the purpose of isolating these in as nearly an unchanged condition as possible, the author adopted a scheme of manipulation, the details of which must be consulted in the original paper, as must also the detailed account of his results, of which the following may find place here. From a mixture of glucosides obtained under described conditions, a mixture of the

Oxymethylanthraquinones—chrysophanic acid and emodin—were obtained by hydrolization and after washing with water on a filter, the emodin was separated from the chrysophanic acid by means of dilute solution of sodium carbonate, which dissolves the emodin alone. The

Chrysophanic Acid (*Dioxymethylanthraquinone*) is purified by crystallization from alcohol, forming small shining scales which, when dried, melted at 162° C., but, on fractional sublimation, yielded fractions having the melting points 186°, 186° and 185° respectively, which correspond well with the latest results of Hesse (1898), who placed the melting point of the sublimed acid at 186° C. Attempts made to produce the glucoside

Chrysophan, described by Kubly as splitting by hydrolysis with hydrochloric acid into chrysophanic acid and glucose, have failed. The product obtained yielded but a minimum of chrysophanic acid, and it is suggested that the bitter glucoside of Kubly is in reality a mixture of a bitter substance, some glucoside perhaps, and among other substances a sugar which either exists in the root, or whose presence may be due to a decomposition of some glucoside during the process of separation. Attempts were also made to obtain the

Glucoside, described by Gibson as yielding chrysophanic acid and glucose by hydrolyzation, and, although a glucoside having the general properties ascribed to it by Gibson, and melting at 208° C. (Gibson = 209° C.) was obtained, this proved not to be a unit compound, even after repeated fractional crystallizations. It always yielded considerable quantities of *emodin* (trioxymethylanthraquinone), and perhaps also *rhein* (tetraoxymethylanthraquinone) upon hydrolysis. There is, however, evidence presented that both of the latter exist in rhubarb as glucosides, but so difficultly separable from the glucoside of Gibson that a pure product of either cannot be secured in the manner attempted by the author. The

Tanoid (rheo-tannic acid) of rhubarb was isolated by the process recommended by Löwe. As obtained it is of a yellowish-brown color when powdered, or consists of dark-brown scales when spread on glass plates to dry. It is soluble in less than 3 parts of water, in glycerin, very soluble in alcohol, acetone and ethyl acetate, but insoluble in chloroform, ether and petroleum ether. With ferric chloride it produces a bluish color, turning to greenish-brown, and finally producing a brownish precipitate, whilst with ferric acetate it produces a blue-black precipitate. On hydrolysis with acids it produces, along with gallic acid, a

Phenolic Body, the properties of which are distinct from any compound described in the literature of rhubarb. Difficulty was experienced to obtain this body in a pure condition, on account of the small quantity at command. As obtained it was fairly white with crystalline product, softening at 172° to 175° C., but darkening at above 200° C. It requires further examination. Of other known constituents, the presence of *gallic acid* and of *crystallizable sugar* were confirmed. Finally, the author endeavored to obtain

Cathartic Acid in the isolated state, but failed in the attempt made.

Proceeding by the method of Dragendorff, he obtained a product which, when dried in vacuum over sulphuric acid, was easily powdered, forming a yellowish brown body, almost of the color of ochre. Upon incineration it yielded 19.4 p. c. ash, consisting of iron and aluminum and silicic acid, somewhat large quantities of sodium, potassium, sulphuric and phosphoric acid, but apparently mainly of magnesium carbonate. Commercial cathartinic acid of senna, (from Schuchardt) yielded 20.22 p. c. of ash, consisting mainly of calcium and magnesium carbonate.—Pharm. Arch., Nov., 1900, 201–216.

SCROPHULARIACEÆ.

Digitalis Leaves, Ph. Germ. IV.—Omission to Prescribe a Quality Test for Digitoxin. — For some years past Caesar and Loretz have adopted a digitoxin standard for digitalis leaves, which they have found to give a fair indication of the quality of the drug. They regret that the Phar. Germ. IV. does not prescribe this quality test, and also that it should retain the requirement to collect the leaves of flowering plants, notwithstanding that it has been repeatedly demonstrated that the leaves taken from wild plants not in blosson are equally rich in digitoxin. Assays of the various ots of digitalis leaves purchased during the year show a range of 0.220–0.409 and an average of 0.280 per cent. of pure digitoxin.—Pharm. Rev., Nov., 1900, 523; from C. & L.'s Geschaeftsber., Sept., 1900.

Digitalis—Histology.—Smith Ely Jelliffe gives a description of digitalis leaves, their histological characters, conspicuous elements of the powder, their adulterants, and the chemical constituents of the drug. Adulterants are: the leaves of *Verbascum phtomoides*, L. and V. *thapsiforme;* the leaves of *Symphytum officinale*, L., and, in the powder, belladonna, stramonium, and hyoscyamus. The complexity of the constituents of the drug is shown by the following enumeration of those described in brevity by the author: Digitonin, $C_{81}H_{52}O_{17}$; digitalein, (?); digitalin, $C_5H_8O_2$; digitoxin, $C_{21}H_{32}O$; digitalic acid; digital-resin. The histological character of the leaves and powder are given as follows, accompanied by an illustration, not reproduced here: The upper epidermis of elongated polygonal cells with sometimes slightly undulating walls, bears here and there simple and glandular hairs, but no stomata. The simple hairs are long, two to four-celled, very thin-walled, the terminal cell bluntly pointed. They show an inclination to turn at the cell-joinings. Often, too, the walls of a single cell are collapsed, while those on either side retain their normal form. The glandular hairs are short, formed of a one- or two-celled pedicel supporting a spherical one- or two-celled head, containing a yellow resinous mass. The mesophyll consisting of a single row of palisade cells and three or four rows of thin-walled, round or elongated parenchyma, loosely arranged, with large intercellular spaces. Calcium oxalate crystals are entirely absent. The structure of the vascular bundle

in the primary nerve is bi-convex, formed of a radial row of vascular tissue and a sieve portion, separated by masses of polygonal, vertically elongated and densely thickened wood tissue. Large-celled parenchyma and interlocked collenchyma occupy the space between the fibro-vascular bundle and the epidermis on either side. The under epidermis is composed of unusually small cells with undulating interlocking outlines. Both varieties of hairs are plentiful. The stomata are also of frequent occurrence. They are small, oval, or often almost round. The most conspicuous element of the powder are the hairs. These, with their extremely thin walls, are of diagnostic importance. Portions of the under epidermis, with their small interlocked cells and stomata, are also noteworthy. For the rest, the fibro-vascular elements and parenchyma are of little value. The absence of calcium oxalate crystals distinguishes this from all other narcotic herbs.—Drugg. Circ., Sept., 1900, 176.

Digitalis—Chemistry.—A. R. L. Dohme reviews the researches that have been made to determine the nature of the active constituents of digitalis, and summing up the status of digitalis chemistry to-day, says that we know little about the glucosides of the leaf, although we do know considerable about those of the seed. This is due to the unfortunate fact that investigators use the preparations of digitalin apparently made by manufacturers who use the seed in making their products. As the seeds contain no digitaleïn we see but little mention of this in the literature, and correspondingly more of digitonin, digitalin and digitoxin. We know the composition and properties of the digitonin, digitoxin and digitalin and digitophyllin of the seed, but hardly as much of the digitoxin, digitaleïn and digitalin of the leaf. There is hence quite a field for work in the study of the glucosides of digitalis leaf, and the results, when they come out, will probably not agree with those of Kiliani, whose work has been on products of the seed, which he maintains are different, as we have seen, from those obtained from the leaf. The problem before those who are interested in the assay of digitalis leaf is to obtain the various glucosides therefrom in quantity and study them, after carefully purifying them, both chemically and physiologically. All such as are found to be therapeutically active and valuable, should be carefully studied and a method worked out that will enable us to determine all the same quantitatively. What has been done on digitalis preparations heretofore should be left unconsidered in this work, as it will probably tend more to confuse than to aid in the work, inasmuch as it applies to different preparations.—Drugg. Circ., Jan. 1901, 4–5.

Digitalis and Its Active Principles — Physiological and Therapeutic Effects, and Causes of Failure to Yield Satisfactory Results.—The "Chemist and Druggist" (January 26, 1901) reviews two papers of interest, presented to the International Congress of Medicine held in Paris, the one, by Sir Lauder Brunton, dealing with the physiological and therapeutic

effects of digitalis and its active principles, the other, by Dr. Joanin, pointing out the causes of failure to obtain satisfactory results in cases treated with these remedies. Sir Lauder Brunton points out that the action of this drug is principally on the heart, the blood-vessels, and the urinary secretion. Its action on the heart determines (*a*) the reduction of the cardiac movement on account of its stimulating action on the roots of the pneumogastric nerve of the mammiferæ; (*b*) strengthening of the systolic contraction; (*c*) increase in the degree of dilatation in the diastole. It diminishes the rapidity of the circulation of the peripheric vessels, which, in conjunction with the increase of the cardiac contractility, causes a rise in the blood-pressure. The diuresis produced by digitalis depends chiefly on this increase of blood-pressure. Digitalis is a local anæsthetic, but sometimes causes pain, and is, therefore, classed amongst "anæsthetica dolorosa." In strong or cumulative doses it gives rise to gastric irritation. The activity of digitalis is due to the presence of digitalin, digitalein, and digitoxin. The action of these three bodies is very similar and differs only in degree. As a therapeutic agent digitalis possesses the functions of a regulator of the heart's contraction, a reinforcer of failing circulation, and a diuretic. The regulating action of the drug is very useful in cases of palpitation and the functional troubles of the rhythmic action. The most important use of this drug is in diseases due to valvular lesions or ventricular dilatation. In the presence of aortic insufficiency digitalis is useless and not without danger if the compensation is complete, but is very useful if compensation is incomplete. When the blood-pressure is already high the administration of digitalis is a source of danger, as it may raise it beyond the safety-point and precipitate symptoms of angina pectoris and give rise to apoplexy.

Dr. Joanin says in his communication that failure of satisfactory results with the digitalis treatment is due to the following causes:—(*a*) To the use of defective preparations, such defects being due to the varying nature of the drug itself as dependent on time and locality of gathering, and also to adulteration of the plant with foreign plants; (*b*) to the employment of substances passing as identical, and as the immediately active principles of the plant, but which are prepared in entirely different methods; (*c*) to the indiscriminate use of the same name for entirely different products of commerce. The only means to avoid the trouble is to establish some uniform rules for the preparation and examination of the constituents of the drug. The author proposes that a method of control, either analytical or physiological, should be sought for, so that pharmacists should be able to judge the leaves as they are sold to them. He also urges the necessity of agreeing on a definite *modus operandi* for the preparation of a galenical representing the drug, and on a method of assay as in the case of the crude drug. With regard to the active principles, it is absolutely necessary to adopt a uniform terminology for the various substances, and to establish fixed methods for their preparation.

Belladonna Root—Adulteration with Poke Root. — E. M. Holmes calls attention to a specimen of adulterated belladonna root, which contains about 60 per cent. of a root identified by him as being poke root. This so closely resembled belladonna root in color that it was overlooked, until a portion of the drug was being powdered for making galenical preparations. The author furthermore observes that the phytolacca root used to adulterate the belladonna gives evidence of an intention to deceive on the part of the persons who dried it, since the larger portions of the root are cut up into linear segments transversely, and not into discoid pieces, as occurs in the root imported from North America when cut. In this way the presence of the concentric rings is not readily visible, and only becomes so when the root is soaked in water. It is therefore obviously not an accidental admixture. The paper is illustrated by cuts showing the distinctive character of the two roots.

In a note to the preceding, Prof. Greenish communicates the following anatomical description, whereby the poke root may be distinguished from belladonna: "Poke root is sharply characterized anatomically by the formation of successive separate rings of wood and bast. This is due to the fact that the original cambium, after a short time, ceases to produce new tissue. A secondary cambium forms in the pericycle, and this produces first several rows of parenchymatous tissue on the outer, as well as on the inner side, then it produces a circle of isolated bundles of wood and bast. After a short time this cambium also loses its activity, and the growth is continued by a third, which, like the second, forms in the pericycle."

"From belladonna root it is distinguished by this remarkable abnormal structure, and also by the calcium oxalate, which occurs in acicular instead of sandy crystals. This forms a means by which the powders can be distinguished from one another or any appreciable admixture of poke root detected in belladonna. The starch of poke root may also be distinguished from that of belladonna when separate, but it would not be easy by this means to detect an admixture of poke root in belladonna, as the latter drug contains in its starch some grains that are almost indistinguishable from the typical grains of poke root starch."—Pharm. Journ., May 11, 1901, 591–592.

Belladonna—Assay of Root and Extract.—Arthur Wayne Clark, having occasion constantly to handle samples of large parcels of belladonna root used in preparing solid extract for making belladonna plasters, and having had some experience with about all the standard methods of assay, communicates the method adopted by him in detail, believing that attention to minutiæ is necessary to success in making these assays and that in the lack of such information exists the chief difficulty in working out a

rational method for one's own constant use. The method is claimed to be quite accurate, and yet can be carried out with a relatively short amount of time given to the work. The method of extracting the root used is hot extraction with a reflux condenser, and while this and the other parts of the process require about twelve consecutive hours for the completion of one assay, still, the total time given to the work need not exceed three or four hours, and during the shaking-out process the work can be left for any length of time necessary, in fact the longer the better. Besides, duplicate assays can readily be managed at the same time. The objection, sometimes made, to hot extraction of belladonna root, on the ground of possible loss of alkaloid from the heat applied, is met by the argument that in all methods proposed, heat is used at some stage of the process. A minute and detailed description of the process being necessary to success, the author's paper cannot be profitably condensed, and must therefore be referred to in the original.—Amer. Journ. Pharm., Jan'y, 1901, 22–29.

Scopola and Belladonna—Comparative Alkaloidal Value.—J. C. Reese and L. E. Sayre have made and recorded some experiments to determine the relative alkaloidal value of scopola and belladonna. They give the details of a circumstantial process of assay, the final determination depending upon the number of Cc. of $\frac{N}{40}$ potassium hydrate solution required to neutralize the excess of $\frac{N}{40}$ sulphuric acid, when a certain number of Cc. of the latter are employed to saturate the alkaloid from a certain quantity of the drug. Obviously, the larger the number of Cc. of $\frac{N}{40}$ potassium hydrate solution required, the smaller the number of Cc. of $\frac{N}{40}$ sulphuric acid consumed by the alkaloid, and the smaller the percentage of the latter in the drug. By employing a suitable factor, this percentage of alkaloid can be determined from the number of Cc. of $\frac{N}{40}$ sulphuric acid consumed; but this the authors do not consider necessary for their present purposes, and are satisfied to state the results obtained with 100 Cc. of percolate, representing 2 Gm. of the respective drugs, as follows:

	Belladonna.	Scopola.
First trial	7.4 Cc.	4.8 Cc.
Second trial	7.3 Cc.	4.6 Cc.
Third trial	7.4 Cc.	4.5 Cc.
Average	7.36	4.63

Weight of extracts from 100 Cc. of percolate:

Alcoholic extract	4.745	7.
Chloroformic extract	.275	.65

—Drugg. Circ., Aug., 1900, 155.

Hyoscyamus Muticus—Large Percentage of Hyoscyamine in the Egyptian Plant.—In their paper on *Hyoscyamus muticus* (see Proceedings, 1899, 525), W. R. Dunstan and Brown mentioned that the plant, grown

in India, contains 0.1 per cent. of hyoscyamine. Subsequently Gadamer recorded the fact that the same plant, grown in Egypt, contains more than ten times that quantity. Dunstan and Brown have since been enabled to examine a specimen of the plant from Egypt, and find it to be much richer in hyoscyamine than the sample of Indian growth previously examined. The seeds furnished 0.87 per cent., and the stems and leaves 0.59 per cent. *Datura stramonium*, grown in the Egyptian Desert, also contains hyoscyamine to the extent of 0.35 per cent., unaccompanied by other atropaceous alkaloid.—Pharm. Journ., Dec. 22, 1900, 723; from Proc. Chem. Soc., *16*, 207.

Stramonium—Adulterations Observed in England.—J. Slinger Ward calls attention to a substitution and adulteration of stramonium in the English market. The substitute was identified to be the leaves of a composite, *Carthamus helenioides*, a native of Algiers, while the adulterant in the case of another sample of stramonium was also the leaf of a composite plant, namely *Xanthium strumarium*, together with fragments of an unidentified leaf. The author gives a lucid microscopic description of the substitute and adulterant, and defines the chief diagnostic features of the several leaves under consideration, as follows:

Datura stramonium: (1) The numerous cluster crystals of calcium oxalate. (2) The characteristic protective hairs. (3) The presence of stomata on both upper and lower surfaces, each stoma being surrounded by three or four cells, one of which is always of small dimensions. (4) The absence of any marked striation of the cuticle.

Carthamus helenioides differs in: (1) The large size of the epidermal cells, their straight walls and well-marked striation. (2) The large size of the protective hairs, the number of cells of which they are composed, and the absence of warty protuberances. (3) The glandular hairs also arise from the whole surface of an epidermal cell instead of a small spot as in stramonium. (4) The entire absence of stellate crystals and the rare occurrence of crystals of any sort. (5) The presence of well-developed secreting ducts.

Xanthium Strumarium differs in: (1) The presence of cystoliths. (2) The small hairs. (3) The small size of epidermal cells. (4) The absence of calcium oxalate rosettes. The paper is accompanied by cuts, showing the microscopical characters of: (1) A transverse section of lamina of *Carthamus helenoides*. (2) The epidermis of *Carthamus helenoides* in surface view. (3) The epidermis of *Xanthium strumarium* in surface view. (4) The lamina of *Xanthium strumarium* in transverse section.—Pharm. Journ., Mar. 16, 1901, 326–328.

Tobacco—New Alkaloids.—Pictet and Rotschy describe three new alkaloids, which they have isolated from tobacco, in addition to nicotine: A second liquid alkaloid, *nicoteïne*, $C_{10}H_{12}N_2$, which is present up to 2 per

cent.; also, a solid alkaloid, *nicotelline*, $C_{10}H_8N_2$, which is present only in very small traces, and, finally, a volatile body, the precise character of which has not been fully investigated. It resembles nicotine in its physical aspect, and is possibly *nornicotine*.—Chem. Zeit., *46*, 118.

Tobacco—Chemistry of the Smoke.—H. Thoms has made an investigation concerning the smoke from tobacco, by which he endeavored to decide the following points: (1) The nicotine and ash content of tobacco; (2) what bases are present in tobacco smoke; (3) what acids are present; (4) what quantity of nicotine is left in the cigar stump; and (5) are carbon monoxide and other poisonous bodies, hitherto unobserved, present in the smoke? The smoke was drawn through absorption tubes containing soda, sulphuric acid, etc., and the ash was collected and examined. It amounted to 20.09 per cent. of tobacco burned, and 18.82 per cent. of this ash was carbonaceous, so that the cigar contained 16.31 per cent. of mineral matter. This consisted chiefly of calcium carbonate, potassium carbonate, calcium and magnesium phosphates, potassium chloride and silicates, as well as silica. The bases found in the sulphuric acid were nicotine, pyridine and ammonia, the pyridine resulting from the decomposition of nicotine. The acids were carbon dioxide and butyric acid, prussic acid not being found. A quantity of nicotine was found in the cigar stump. About 75 per cent. of the nicotine present goes over with the smoke, part of it being decomposed into pyridine and other bodies. Carbon monoxide was present in the smoke, and a volatile oil which could be steam-distilled from the tobacco. In 15,000 Gm. of tobacco there is 6 Gm. of this oil. It is dark-colored and balsam-like, the smell resembling that of chamomile oil. It boils at 295° C. to 315° C., contains no terpene, but a phenol; ammonia was found in the water in which it was distilled, which probably owed its origin to the fermentation of the tobacco. On evaporation the oil emits similar products to those obtained from tobacco. By shaking out the sulphuric acid and soda (through which the smoke had passed) with ether an oil of extreme toxicity was obtained. From 20,000 Gm. of tobacco 75 Gm. of this oil was obtained. It was dark colored, and had a narcotic odor. From this ethereal solution a phenol was obtained, boiling at 190-200° C., with a creosote-like smell. The chief part boils between 220-230° C. It contains nitrogen and sulphur. It quickly produces headache, vomiting, etc. The effects of tobacco smoke are traceable, therefore, not only to nicotine, but also to carbon monoxide, and, above all, to the poisonous oils.—Schweiz. Woch., Jan. 19, 1901, 27.

Tomatoes—Detection of Artificial Color in Preserves.—G. Halphen recommends the following practical method for determining the presence of foreign coloring matters in preserved tomatoes. To detect coal tar colors he evaporates the pulped tomatoes, previously mixed with sand, to dryness, on the water bath, or, where the presence of unstable nitro-colors

is suspected, which would be decomposed by heat, the operation is conducted at ordinary temperatures. The dry mass is rubbed to powder, transferred to a small wide-mouth flask, and thoroughly moistened with rather more than its volume of glacial acetic acid; after thorough mixing, it is left for ten minutes, about twice its volume of alcohol (90 per cent.) is then added, the mixture again agitated, allowed to stand for ten minutes, and filtered into a 250 Cc. flask. The filtrate is then diluted with ten times its volume of water; a small skein of four or five short flosses of ungummed silk is thrown into the liquid, which is then boiled for fifteen minutes. The silk may be examined from time to time; in the presence of coal-tar colors it speedily becomes tinted with a salmon, brownish-yellow, reddish, or red-brown shade, which washing with soap and water turns red, rose, or salmon color. In the absence of coal-tar dyes, the skein is merely tinged with yellow or brown, without any shade of red or rose. For the detection of cochineal, which is always employed in the form of cakes, it is preferable to work with a fresh portion of the tomato pulp, dried with sand. This is intimately mixed with sufficient commercial hydrochloric acid, sp. gr. 1.16 to 1.17, to thoroughly moisten the mass, to which, after ten minutes' contact, twice its volume of 90 per alcohol is added; the mixture is set aside for ten minutes, then filtered. To the filtrate at least ten times its volume of water is added; the solution transferred to a separator and shaken out with sufficient amylic alcohol to give not less than 5 Cc. of supernatant layer after the separation of liquids. The aqueous layer is run off and the amylic alcohol, containing any carminic acid present, may be tested directly with uranium acetate, but a more definite result may be obtained by first removing the natural coloring matter of tomatoes, as follows: To the amylic alcohol solution from 1 to 1.5 times its volume of carbon disulphide is added, then 4 to 5 times the volume of water, separation of the solvents being aided by a rotatory agitation. After standing, the lower layer is drawn off, and the aqueous portion thrown on a small moistened filter. In the presence of cochineal the aqueous filtrate will be of a distinct rose tint with a shade of yellow. This is shaken up with 2 or 3 Cc. of amylic alcohol, which extracts the coloring matter; the aqueous liquid is run off, the amylic alcohol extract transferred to a test tube and treated with one drop of a solution of neutral uranium acetate. On agitation a green coloration, characteristic of carminic acid, will be obtained.—Pharm. Journ., Sept. 15, 1900, 313; from Journ. de Pharm. [6], *11*, 169.

OLEACEÆ.

Olive-Manna—Occurrence and Characters.—J. A. Battandier states that in the gardens of Mansourah near the "Iron Gate" of the Danube, there are some very ancient olive trees, the trunks of which yield manna in abundance, some of the exudations weighing almost a kilo. This

manna yielded 52 per cent. of mannite identical with that from the manna ash. The residue consisted of sugar, gummy matter, debris and water.—Amer. Journ. Pharm., June, 1901, 303; from Jour. de Pharm., 1901, 177.

LABIATÆ.

Mentha Piperita—A New Cultivated Variety.—P. I. Aguelli, of Csari (near Sassin), Hungary, describes a sort of peppermint, which he has grown and improved for a number of years, and for which he claims many advantages over ordinary *mentha piperita*. It is claimed that the plants of the new sort do not degenerate from year to year as does the ordinary variety, that it grows more rapidly, its leaves are much larger, and its odor, which is peculiar, powerful yet fine, readily distinguishes it from the ordinary sort. The young plants are for sale, and have already been introduced in different European states, being known in Germany as Aguelli's improved peppermint.—Pharm. Rev., Aug., 1900, 377; from Pharm. Post, *33*, 253.

Peppermint—Cultivation in Northern Indiana.—Leo Eliel contributes an interesting paper on the cultivation of peppermint in the land reclaimed by the drainage of the Kankakee Swamp in Northern Indiana, and the method practiced in the distillation of the oil. He says that in early spring the ground is plowed and furrows marked out two or three feet apart, in which the plants and runners, which have multiplied from the setting of the previous year, are placed, one acre furnishing sufficient to plant ten acres of ground. The roots are from one-eighth to one-quarter inch in diameter and one to three feet in length when in good condition. The workmen in planting carry the roots in bags over their shoulders, and place them in rows so there are one or two roots at every point of the row. While planting the roots with their hands they cover them at the same time with their feet, and the queer motion of the workmen is an interesting sight. An experienced workman will plant an acre a day, if the ground is in good condition. Plants will appear above ground about fifteen days after setting. They are cultivated until July, when, if the season has been fair, the plants have thrown out enough runners to make further cultivation difficult and unnecessary. The time for distillation is when the plant is in full bloom. This is during the latter part of August or early in September. The second and third years' growth matures earlier. Some seasons a second crop is obtained. The plants are cut and allowed to wilt and partially dry before being drawn to the still. The average yield from green plants is stated to be four-tenths of one per cent. of oil. The yield of oil varies very much from the same field, and seems to depend on atmospheric conditions, as mint cut after a warm and humid night will yield a much greater percentage than if cut after a cool and dry night. The distillation is now conducted in large wooden vats, to which live steam is conveyed by a pipe entering at the bottom — the kettle, which had

served as a still, now being displaced by a boiler to generate the steam. Distillation is more perfect; scorching is avoided, and, in consequence, no empyreumatic products are formed. It also distills with greater rapidity and economy. The vats, as a rule, have a capacity of from 700 to 1,000 pounds, and will deliver from 75 to 100 pounds of oil during a day's run. Some of the more modern stills are constructed with double vats, distilling from one while the other is being either charged or discharged. The boiler also runs a pump, the water being carried up and allowed to trickle over the condensing pipes. The distillate is carried into a receiving vessel so constructed that the oil can be skimmed off while the water discharges through a waste pipe. — Proc. Indiana Pharm. Assoc., 1900, 85–86.

Salvia Glutinosa—Peptonizing Ferment in the Glandular Hairs.—According to Prof. L. Macchiata, the well-known glutinous hairs which clothe the stalk of the inflorescence of this plant secrete a peptonizing ferment, through the agency of which insects which are captured and detained by the secretion are digested, as in the sundew, or Venus' fly-trap.—Pharm. Journ., March 16, 1901, 323; from Bull. Suc. Bot. Ital., 1900, p. 327.

BORRAGINEACEÆ.

Cynoglossum Officinale—Alkaloids in Root.—Vournazos states that he has isolated two alkaloids from the root of *Cynoglossum officinale*. The first, "cynoglosseine," obtained in small prisms melting at 115°, is very soluble in water and almost insoluble in ether. The second alkaloid, "cynoglossidine," occurs as a brownish crystalline powder, melting at 138°. These two alkaloids are probably identical with the cynoglossine and consolicine of Greimer (see *P. J.* [4], *11*, 490), but the author does not refer to those previous researches on the toxic borraginaceous plants. According to Vournazos, "cynoglosseine" is present in the root to the extent of 2.5 to 3 per cent., and cynoglossidine in even greater quantity. He considers the latter to be the active principle of the drug.—Pharm. Journ., April 13, 1901, 459; from Repertoire [3], *11*, 105.

Ka-lah-met Wood—A Fragrant Burmese Drug.—Dr. E. M. Holmes calls attention to a fragrant wood brought here from Burmah and presented to the museum of the Pharmaceutical Society by Mr. H. B. Smith. The tree which yields this wood, known as "ka-lah-met wood," is described by Kurz under the name of

Cordia Fragrantissima, a deciduous tree with elliptical oval leaves, which are tomentose when young, but lose it and become glabrescent when older. The short-stalked white flowers, which are produced in May, are in one-sided dichotomous racemes, forming auxiliary and terminal tomentose cymes. The wood has an odor somewhat resembling that of musk seed and honey mixed, which seems to be very lasting and persistent. It is said to be used by the native Burmese ladies as a cosmetic, a piece of

the wood being rubbed with water on a small stone until a whitish cream is formed, which is applied to the skin. The wood is brought to the coast from far inland, and is quite scarce.—Pharm. Journ., May 11, 1901, 594.

CONVOLVULACEÆ.

Jalap—Simple and Accurate Method of Testing.—O. Schweissinger states that the methods ordinarily followed for determining the percentage of resin in jalap give results which are usually too low, but that accurate and concordant results may be obtained by the following simple method: Place 10 Gm. of finely powdered jalap and 100 Cc. of alcohol into an agitator, and shake the mixture continuously for 24 hours, maintaining a temperature of about 30° C. After subsidence, 50 Cc. of the clear liquid is drawn off with a pipette, evaporated to dryness, and the residual resin washed with water according to the method of the Germ. Pharmacopœia. It is then dried and weighed.—Pharm. Centralh., Jan. 3, 1901, 1.

Jalap—Examination.—Owing to the uncertainty in value of specimens of crude and powdered jalap, Alfred Heineberg undertook a series of investigations for determining the value of this drug on lines suggested by Prof. Henry Kraemer, viz., (1) specific gravity; (2) assay (by the method of the U. S. P.); (3) quantitative microscopical estimation of starch. Two lots of jalap were taken, designated as *A* and *B* respectively. The tubers of *A* were broken open, and those light in color and starchy were separated from those dark in color and resinous. The tubers of *B* were also broken open, but not separated, the breaking open being necessary before taking the specific gravity because of large air-spaces in some cases. Omitting the details of the methods employed to reach his results, the following tabulated statement will serve to record the facts ascertained by the author's investigation:

Sample.	Per cent. of Resin.	Sp. Gr.	Crystals to Milligram.	Starch to Milligram.
A Starchy	1.76	1.194	88	357
A Resinous	6.62	1.360	125	140
B	7.64	1.297	107	178

It becomes apparent from these figures that the increase in specific gravity is due to the amount of calcium oxalate rather than to the increase in resin; but the increase in calcium oxalate is accompanied by an increase in resin, although not in corresponding proportion.—Amer. Journ. Pharm., Nov., 1900, 528–534.

Scammony—Quantitative Valuation and Examination.—P. L. Asla-

noglon proposes the following method for the quantitative examination of scammony for commercial purposes: To a weighed quantity of scammony add some ether and gently warm, to dissolve quicker; let it stand to settle, and filter through some cotton-wool; to the residue add some more ether, and repeat as above three times. All earthy and insoluble matter will remain in the filter. Wash well the cotton-wool with warm ether, and to the filtrate add enough turpentine, and let it stand for some some hours, when a globular, oily-looking precipitate will be found to settle down in the ether-turpentine mixture, consisting solely of scammony; any admixture of other gum-resins will be kept in solution by the ether-turpentine mixture; the scammony, being insoluble in turpentine, precipitates. Decant the ether-turpentine mixture, wash precipitated scammony with fresh turpentine only, evaporate gently on a water-bath, and weigh; thus one has the commercial value of scammony in samples. To estimate the earthy insoluble matters, the cotton-wool filter should be dried, with its contents, in a water-oven, burned, and weighed; of course, the ash of cotton-wool per gram used should be known. The ether-turpentine mixture, evaporated and weighed, will give the amount of foreign gum-resins. —Chem. News, March 29, 1901, 146.

False Scammony Root—Occurrence and Sale in the English Market.—Dr. E. M. Holmes describes and illustrates with cuts, a false scammony root which has recently been offered, and some sold, in the London market. The upper portion of the large root is 2 to 3 inches in diameter, and at the crown presents the scars of numerous slender stems, which seem to indicate that either it is a perennial climber, like some of the menispermaceæ, or that it has weak, slender, flowering stems, arising from a large perennial root, as is the case in many of the genus *Gypsophila* in the caryophyllaceæ. The outer portion of the root consists of a thin, brittle bark of a blackish-brown color. and cracked and warty below the crown. A transverse section exhibits six or seven rings of wood, which readily break up into coarse, somewhat flattened fibers—so much so that three expert section-cutters have stated their inability to cut a good section of it. It has no odor and no especial taste, but leaves a slight acridity in the throat when chewed, probably due to some variety of saponine, since a fragment of root shaken up in the test-tube with water gives a very frothy solution. Under the microscope the most characteristic feature is the enormous quantity of minute, simple, rhomboidal, prismatic crystals present, and the absence of starch. The botanical source has not yet been ascertained.—Pharm. Journ., May 11, 1901, 595.

BIGNONIACEÆ.

Carajuru—Red Coloring Matter Obtained from a Bignonia.—Dr. E. M. Holmes gives some information concerning a red pigment, recently presented to the Museum of the Pharmaceutical Society by Messrs. Wright,

Layman and Umney, which is apparently known by several names in South America, namely, "Carajuru," "Crajuru," or "Carcaru." He observes that two or three substances similar in general appearance to carajuru are used by the South American Indians in Brazil, Bolivia and Guiana as a pigment, and have been noticed from time to time. These include chica, obtained from the leaves of *Bignonia chica;* ula leaves, obtained from an unknown species of bignonia in Bolivia; and a pigment made in Minas (Brazil) from the heart-wood of *Bignonia tecoma.* Carajuru or crajuru has been investigated by J. J. Visey, in 1844, but it is not clear whether he speaks of carajuru or chica. An examination of the above-mentioned specimen of carajuru, by Mr. C. T. Bennett, gave the following results: The coloring matter is but slightly soluble in 90 per cent. alcohol, a saturated solution containing only about 0.4 per cent. It is soluble in acetone to about the same extent, but only very slightly in ether, benzene and amylic alcohol. A good color is obtained with alcohol containing 10 per cent. of acetic acid (glacial). The solutions show a green fluorescence, which is most marked in the acetone solution, and yields on evaporation a deep red varnish of a resinous nature. On trituration with solution of ammonia (10 per cent.) partial solution takes place, probably indicating the presence of an acid resin, but the solution is dull and opalescent and not easily filtered. All these solutions become yellow on the addition of mineral acids unless very dilute, the red color reappearing when an alkali is added. Organic acids do not visibly affect it. Carajuru yields on incineration about 20 per cent. of ash. This was found to consist chiefly of silica, with a little oxide of iron, and traces of alumina, soda and potash.

According to Th. H. Lee, a similar coloring matter is made in the uplands of the province of Minas, Brazil, by mixing the sawdust and shavings of a tree which he calls *Bignonia tecoma* with slaked lime and heating the mass with water. From this Mr. Lee has isolated a coloring matter which he calls "tecomin," and which seems to be closely allied in characters and reaction to the coloring matter found by Mr. Bennett in carajuru. Alkalies change it to a full rose color and acids to yellow; its use as an indicator is therefore suggested.—Pharm. Journ., May 11, 1901. 595.

GENTIANACEÆ.

Gentian—Proposed Description for the U. S. P., 1900.—Charles Sterling and L. E. Sayre have studied the physical characteristics of gentian root, and suggest that the Committee of Revision of the U. S. P., 1900, bearing in mind that gentian is the dried rhizome and root of *Gentiana lutea*, L., shall adopt the following as the official description: "It consists of nearly cylindrical pieces, entire or longitudinally sliced, varying in length, about 25 Mm. thick. Color, externally, yellowish-brown to reddish-brown; internally, reddish-yellow. Somewhat flexible and tough when moist; rather brittle when dry. The root is longitudinally wrinkled,

while the rhizome, in addition to this, bears closely-set transverse wrinkles. Fracture smooth, not woody or fibrous. Cortex is rather thick and separated from the central portion by a dark ring of cambium and the more delicate cortical tissues. The central portion consists of parenchymatous tissue, containing groups of water tubes, scattering near the center, and gradually becoming more numerous as they approach the cambium, thus forming an outer zone somewhat radial in structure and lighter in color than the rest of the central portion. Odor is heavy and characteristic. The taste is at first sweetish, afterwards decidedly bitter. Gentian gives no definite reaction for starch."—Drugg. Circ., Dec., 1900, 243.

Gentian—Occurrence of Saccharose along with Gentianose in the Fresh Roots.—E. Bourquelot has determined the presence of saccharose along with gentianose in fresh gentian roots. From his previous study of *gentianose*, a sugar whose exact constitution has not yet been fixed, the author believes that the cane-sugar which is found in fresh gentian roots is produced by a peculiar splitting up of the gentianose itself.—Chem. News, Nov. 30, 1900, 267; from Compt. Rend., Nov. 5, 1900.

APOCYNACEÆ.

Nerium Odorum—Proximate Constituents.—In addition to the two active constituents of *Nerium odorum*, which Greenish has described as "neriodorein" and "neriodorin" respectively, B. C. L. Bose has now succeeded in isolating a third active constituent of this plant, which he names "*Karabin*."—It possesses the characters of a resin and on analysis gave figures corresponding to the formula $C_{21}H_{49}O_6$. It is insoluble in cold or boiling water, but dissolves readily in ether or in benzene. Neriodorein, on the other hand, is readily soluble in cold water, and neriodorin in boiling water, while both compounds are insoluble in ether or in benzene. The color reactions of the substances with concentrated sulphuric acid are also said to be distinctive, but they are not described. Neriodorin is considered by the author to be a variety of saponin, and neriodorein satisfies most of the tests for saponin.—Pharm. Journ., May 4, 1901, 553; from Proc. Chem. Soc., 17, 92.

Nerium Oleander—Characters of Oil from the Leaves.—Haemel has isolated from the leaves of *Nerium oleander*, a semi-concrete oil, to the amount of 0.025 per cent. The oil consists of a liquid and a solid portion. The liquid portion is dark colored, has a faint acid reaction, and is strongly odorous. The solid portion is an unctuous mass at ordinary temperatures, but forms a brownish-green fluid at about 25.5° C., and is acid to litmus.—Pharm. Ztg., Jan. 19, 1901, 58.

Nux Vomica—Alkaloidal Assay of the B. P.—In the course of some criticisms of the B. P. process for determining the alkaloid in nux vomica,

as applied to the liquid extract, F. C. J. Bird observes that the method works well with the assay of the solid extract if 3 Gm. be taken, rubbed down with water to a perfectly smooth paste, and the process then continued according to the official directions. It is by no means certain, however, that the figures obtained by the B. P. process represent the amount of strychnine present (see *Strychnine*, under "Organic Chemistry"); but given similar details of manipulation, very fairly concordant results may be relied upon. Concerning some of the details of manipulation, the author observes that generally in the first extraction by chloroform from alkaline solution, separation is prompt with most samples, and no difficulty is experienced; but it is always advantageous to perform the first agitation in a conical flask with a wide, flat bottom, as on warming this the chloroform, from contact with the hot glass, separates very rapidly in a clear condition. Then transfer to a separator and run off the chloroform, the second and third extractions being carried out in a similar manner. With other samples of extract containing more fatty matter this procedure is not sufficient to cause a clear separation, and it will then be found expedient to force the whole through cotton wool by air pressure in the apparatus recommended by the author for ipecacuanha (see Proceedings, 1900, 822). Samples are, however, sometimes met with which refuse to yield anything but a thick milky chloroformic layer under any circumstances, and in that case the fatty matter, etc., must be removed by preliminary treatment with chloroform in acid solution. The evaporated, liquid extract, or solution of solid extract, is acidified with 5 Cc. of dilute sulphuric acid, 15 Cc. of chloroform added, the whole agitated vigorously, and warmed in a flat-bottomed conical flask. The chloroform is separated and the treatment repeated with another 5 Cc. of chloroform. The mixed chloroforms are placed in a dish, 5 Cc. of diluted sulphuric acid and 5 Cc. of water added, and the chloroform removed by evaporation. The aqueous liquid is separated from the fat, etc., by filtration, and returned to the original solution, which is neutralized with sodium carbonate, made up to about 23 Cc. with water, and the official method proceeded with. Some observations are also made concerning the final separation of the strychnine as ferrocyanide, as follows: Take a separator having a capacity of 200 Cc., plug the neck with a *very small* pledget of cotton-wool, half fill with water, and add the mixed acid solution of the alkaloids. Now add a *freshly prepared* solution of potassium ferrocyanide 1.25 Gm. in a sufficiency of water, fill the separator, previously referred to, to the neck with more water, insert the stopper, and agitate occasionally during half an hour. After standing for the prescribed period, adapt an air pressure ball to the separator, open the tap and force the mother liquid through, leaving the strychnine ferrocyanide as a white compact column in the neck of the separator. Use 100 Cc. of diluted acid for washing, added 10 Cc. at a time, and forced slowly through the precipitate by air pressure. The

washing is very effective, the precipitate being percolated with the dilute acid, the use of a filter paper and exposure to air are avoided, and the whole operation is quickly performed.—Pharm. Journ., Aug. 18, 1900, 214–215.

In a subsequent paper Mr. Bird communicates the details of the foregoing assay process as applied to nux vomica seeds, to the liquid and solid extracts, and to the tincture, and also of an alternative method applied to the same. Concerning the influence of the quantity of extract taken and the time allowed for precipitation on the yield of strychnine, the author's experiments seem to show that, so long as the exact details of the process are adhered to, it is immaterial whether 10 or 5 Cc. of the liquid extract, for instance, are taken, or whether the time for precipitation be two hours or six hours.—Pharm. Journ., Nov. 24, 1900, 574–575.

Nux Vomica—Alleged Presence of Copper.—Referring to recent observations that copper was apparently a natural constituent of nux vomica (see Proceedings, 1900, 596), Frederick T. Gordon has examined five specimens of tincture of nux vomica obtained from different sources and found them to be free from copper. He concludes from these and other observations that if copper is present in preparations of nux vomica it must be so accidentally, and probably derived from copper vessels used in the process of their manufacture.—Amer. Drugg., July 9, 1900, 3.

Strophanthus "Kombé"—Morphological and Histological Characters of the Seed.—One of the most comprehensive studies of the morphology and histology of strophanthus seed that has so far appeared has been contributed to the British Pharmaceutical Conference, at the meeting in 1900, by Pierre Elie Félix Perédès, who introduces his subject by an historical resume of the "kombé" drug up to the time of its introduction into medical practice. The details of this masterly study, which is enriched by a series of eight plates, exhibiting sixty-three figures, must be consulted in the original. The following summary may find place here: An examination of typical East African "kombé" seeds, all obtained from the same pod, reveals that these seeds vary considerably in size and shape. A ventral, more or less median ridge, extends from the apex of each seed to half or two-thirds of the way down; somewhere on this ridge the funicle-scar is found, but its position is variable. The hairs on their surfaces are stiff and silvery, point upwards, and are arranged in longitudinal rows. The color of a scraped seed is some shade of green or brown-green, that of the intact seeds varies with the position of the observer with regard to the seed and to the incident light, this being due to the position of the hairs. By soaking, the seeds can be separated into three distinct portions—seed-coats, albumen, embryo—whose details can be observed. The seed-coats and the albumen are longitudinally ridged and grooved; the grooves in the seed-coats are filled up by upwardly directed epidermal hairs. The cells of the epidermis of the seed-coats show, on careful examination, consid-

erable variations, and, in most cases, a more complicated structure than has hitherto been supposed; their hairs never exceed one millimeter in length; the appearance presented by their side walls in transverse section, although doubtless of diagnostic value, is far from uniform, and should be taken into consideration in comparing different varieties of strophanthus seeds. The sub-epidermal layers of the seed coats, in a soaked seed, may be roughly divided into three regions: a thin inner mucilaginous strip, a middle pigmental band, irregularly arranged loose outer aggregations occurring only under the ridges. The cells of these layers have very thin walls and thickened corners; intercellular spaces are absent. Under the ventral median ridge of the seed these three regions are well marked, and in the outer loose tissue, below the insertion of the funicle, the spiral vessels of the raphe are situated. Spiral vessels occur nowhere else in the seed-coats, and no evidences of lacticiferous tissue has been found. The cells of the albumen present very different appearances according to the conditions of observation, but it is very probable that they are polygonal and thin-walled, with the exception of those of the outermost layer, whose outer walls are thickened, and of those constituting the innermost compressed layers. The embryo consists of two straight plano-convex cotyledons, joined by a well-marked radicle directed towards the apex of the seed; lacticiferous tubes occur whose distribution is conveniently made out with "ruthenium red" in lead acetate. The cells of the embryo contain aleurone grains and oil in abundance, the latter not visible as such till the section be treated with aqueous reagents; starch also occurs in very small grains, especially in the midribs of the cotyledons. The contents of the albumen are similar to those of the embryo, but more scanty and, with the exception of the starch, difficult to make out; large vacuoles are present; the starch grains may attain 0.01 Mm. The pigment of the seed-coats is probably chlorophyll. The action of concentrated sulphuric acid is constant in the case of the albumen, but variable in that of the embryo; the former always exhibits a green color in this reagent, the latter varying shades of green, green mottled with red, or green in one cotyledon and red in the other. The taste of the seeds is intensely bitter.

The author in conclusion observes that the results obtained are most disappointing, inasmuch as every histological character upon which the identification of the different varieties of "kombé" seeds have hitherto been based, is found, almost without exception, to exist in seeds obtained from one and the same pod; and although he has approached the question with every prejudice in favor of Dr. Blondel's conclusions (of the existence of three distinct varieties of "kombé" seeds), he has unwillingly been compelled to abandon them one after the other. The paper concludes with a voluminous bibliography, and an explanation of the figures. —Trans. Brit. Pharm. Conf., 1900, 366–393.

Strophanthus Seed—New Admixture.—Pierre Élie Félix Perrédès calls

attention to a new admixture of commercial strophanthus seeds, which was observed in a small consignment that reached the market in the early part of this year (1901) from East Africa under the designation of "Mandala Brand." These seeds were loose and freed from their awns. A good proportion of them was found to answer perfectly the description of the official seed, but admixed with them were slightly smaller seeds of a brownish tint, which could be easily picked out by hand from the sample. These have been the subject of the present study, undertaken at the suggestion of Mr. E. M. Holmes, who also supplied the author with a pod, containing seeds of a hitherto undescribed variety, of East African origin, and derived from a plant which Mr. Holmes has named

Strophanthus Courmontii, Sacleux, var. *Kirkii*.—Mr. Perrédès found the seeds contained in this pod to agree in shape and size with the brown "Mandala" kind, but to be more hairy. His subsequent, more detailed examination, which is recorded in the present paper and accompanied by numerous cuts, has convinced him that they are identical, and that the smoother appearance of the commercial sample is due to loss of hairs by friction. Omitting the details of the investigation, which was conducted in the Wellcome Research Laboratories, the author's summary of the points which are likely to be of value in distinguishing these seeds from the official (B. P.) ones, is briefly as follows:

(1) The smaller average size and more lanceolate shape.

(2) The distinctly brown color.

(3) The absence of a distinct ridge on the ventral surface.

(4) The absence of dome-shaped outer walls in the longitudinal sections of the epidermal cells, this being due to the absence of lignified ascending bands.

(5) The presence, in great abundance, of "prismatic" crystals of calcium oxalate in the sub-epidermal tissue of the seed-coats.

(6) The absence of a dark green color in the albumen when a section is treated with concentrated sulphuric acid.

(7) The less intense bitter taste.—Pharm. Journ., April 27, 1901, 518–521.

Strophanthus Kombé Seed—Commercial Varieties and Source. — E. M. Holmes, after calling attention to his persistent, though, for various reasons, unsuccessful endeavors to induce the exporters in the Shiré Highlands of British Central Africa to send only the pure seed of *Strophanthus kombé*, and, if possible, in the pods, mentions that he has recently received four apparently distinct plants from which kombé seed is said to be collected. From an examination of these and other evidence, which must be consulted in the author's paper, he arrives at the following conclusions: (1) That the species of strophanthus known to grow in Nyassa Land, and which there is every reason to suppose furnish some of the so-called kombé seeds of commerce, are (*a*) *Strophanthus kombé*, Oliv., (*b*) *Strophanthus*

emini, Asch., (*c*) *Strophanthus courmontii*, Sacl., and the varieties that he has called var. *fallax* and var. *kirkii*. (2) That the *S. courmontii*, var. *kirkii*, has a shorter pod with brownish seeds and a smaller flower, and leaves with more patent veins than the plant figured by Frauchet in his "Études sur les Strophanthus," and that the seeds of this plant have recently come into commerce in London mixed with the greenish seeds of *S. kombé*. (3) That the seeds of var. *kirkii* have a red reaction with sulphuric acid. The seeds of *S. courmontii* var. *kirkii* have been handed to Mr. Perrédés for histological examination (see below). Mr. Holmes' paper is illustrated by cuts, showing the distinctive characters of the leaves and flowers of two varieties of *Strophanthus courmontii*, Sacl., var. *fallax* and var. *kirkii*, and also a pod and a seed of the latter variety, all in natural size. The author also mentions that the seed he has recently received direct from the importers consists of at least three or four varieties. One of these is evidently kombé seed, greenish-grey in color, and giving a green reaction with sulphuric acid; a second, also of a greenish-grey color, but giving a pinkish-red reaction with sulphuric acid; and a third of a brownish-green tint, giving also a red reaction with sulphuric acid. A fourth has been noticed by Hartwich in pods, which he had recently sent him. This is a brownish seed of Nyassa Land origin, which gives a blue reaction with sulphuric acid, both in the endosperm and embryo. A fifth variety, which came quite recently as loose seed, but mixed with true kombé, is of a brownish color, gives a red reaction with sulphuric acid, and contains crystals of oxalate of calcium in the seed coats. This is the specimen referred by Mr. Holmes to Mr. Perrédés for histological examination.—Pharm. Journ., April 20, 1901, 486–489.

Strophanthus Kombé Seeds—Character of Recent Importations in Pods.—The persistent efforts of Dr. E. M. Holmes to prevail upon importers that they shall insist on the delivery of strophanthus seed *in pods* seems to have met with some success, since he is enabled to report on the character of seeds taken from the pods contained in ten bales of this drug. He finds, however, that even the pods arrive mixed together, as becomes evident from an examination of the seeds taken out of the pods from the ten bales mentioned:

Bale.	Green Reaction.	Red Reaction.	Remarks.
1	4	—	—
2	4	—	—
3	4	—	Embryo half-red, half-bluish.
4	2	2	—
5	1	3	—
6	2	2	—
7	—	4	—
8	—	4	—
9	—	4	—
10	1	3	—

When the seeds are once taken out of the pods and mixed, it is, as a rule, practically impossible to separate the different kinds, the exception to this rule being the parcel mentioned in Dr. Holmes' previous paper (see above) and submitted to Mr. Perrèdés for histological examination. —Pharm. Journ., May 11, 1901, 592.

Strophanthus—Chemistry and Pharmacology.—Dr. E. M. Holmes states that in the recent paper on "The Chemistry of Strophanthus," by Dr. F. Feist (see *Strophanthus glucosides*, under "Organic Chemistry"), two points are not very clear, (1) It is not distinctly stated if he considers the strophanthin of Arnaud, which gives a red reaction with sulphuric acid, and which Dr. Feist now designates pseudo-strophanthin, to be identical with the ouabain of Arnaud, which also gives a red reaction with that acid. (2) In the table given by Dr. Feist the seeds used by Fraser are said to have been greenish-white, and those used by Böhringer pale green, both of which gave a glucoside with a green reaction, and are attributed to *S. kombé;* but the *green* seeds used by Arnaud and by Kohn and Kulisch, and supposed to be "*S. kombé* or *S. hispidus*," yielded a glucoside giving a red reaction with sulphuric acid, and the *brown* seeds used by Merck and referred to *S. hispidus*, yielded a glucoside giving a red reaction, whilst the glucoside of those used by Schuchardt, the color of which is not stated, but which were referred by him to *S. hispidus*, gave the red reaction also. Dr. Holmes observes, however, that the seeds of *S. kombé* are unquestionably greenish in color, and give a green, not a red, reaction, with sulphuric acid, and the seeds of *S. hispidus* are as certainly brown in color, smaller, and also give a greenish reaction with the same acid. Obviously, therefore, either the green seeds as well as the brown seeds must contain two glucosides, or the green seed as well as the brown seed must be of two kinds, or there must have been changes effected by the chemists concerned in the process of extracting the glucosides. As Dr. Feist states that the glucoside giving the red reaction, and designated by him pseudo-strophanthin, is stated to be nearly twice as active as strophanthin when administered subcutaneously, it seemed to be a matter of importance to clear up this difficulty about the seeds. In reply to an inquiry addressed to Dr. Feist, the following information was received:

(1) That he is in no way responsible for the names given to the seeds, and he does not deal with the subject from the botanical point of view. (2) He does consider that Arnaud's ouabain is *not* the same as pseudo-strophanthin, and that the strophanthin of Arnaud and Kohn is identical with pseudo-strophanthin, but not with Fraser's and Feist's strophanthin. (3) With respect to the seeds, he has never met with seeds containing the two glucosides nor with strophanthins which were a mixture of strophanthin and pseudo-strophanthin. He has only met with strophanthin giving a green reaction with sulphuric acid, obtained from the whitish green seeds of *S. kombé*, but has ascertained that pseudo-strophanthin is found both in

green and in brown seeds. He does not consider that a red reaction with sulphuric acid indicates the presence of pseudo-strophanthin in the seed, since all the sugars in the seeds turn red with sulphuric acid in the beginning, and he considers that the fact that his seeds were mixed, containing, however, about 90 per cent. of kombé seed giving the green reaction, shows that the other green seeds mixed with it could not have contained any glucoside, even though they gave a red reaction; in fact, that this color might be due to sugar.

The results, therefore, of Dr. Feist's investigation are that there are two distinct strophanthins besides ouabain contained in seeds of the *Strophanthus* genus, and that the strophanthin giving the red reaction with sulphuric acid is nearly twice as powerful as that giving the green reaction, at all events when administered subcutaneously. From the statement that green seeds may yield either glucoside, and that brown seeds apparently yield only the one giving a red reaction, it appears at first sight as if the latter seed were the most satisfactory to employ in medicine. But it is very doubtful if the true seed of *S. hispidus* has been examined, since authentic specimens of *S. hispidus* brought home by Barter (Baikie Expedition) give the green reaction. The only safe plan would seem to be to employ in medicine a glucoside giving a definite reaction, and having a definite melting-point. For other interesting observations, particularly those concerning the varieties and sources of strophanthus seeds, the original paper must be consulted in Pharm. Journ., Oct. 6, 1900, 388–389.

Strophanthus Seed—Method of Assay.—A. R. L. Dohme, in search of a reliable method for the assay of strophanthus seed, has tried those of Elborne, of Frazer and of Barclay. He finds that while the results obtained by Barclay's method are not as high as those obtained by Elborne's, they are higher than those obtained by Frazer's method. Moreover, the method is not very tedious, as are Elborne's and, particularly, Frazer's, and it appeals more than either of them to the chemist as being the most correct and scientific one.

Barclay's Method depends on the conversion of the whole of the strophanthus in the sample into strophanthidin, thereby avoiding the possible loss occasioned by partial splitting up of the glucoside during the process of its extraction. From the strophanthidin obtained it is easy to determine the amount of strophanthin in the drug. The seeds are extracted with alcohol and the latter removed by distillation. The residue is treated with water and the aqueous mixture extracted with chloroform to remove all the fats and oils present. After removing the chloroform layer, the aqueous portion is acidified with a little dilute sulphuric acid and heated for an hour on the water-bath. The resulting cloudy solution is shaken several times in a separator with chloroform until this removes nothing further from the solution. The combined chloroform solutions are evaporated carefully, whereby strophanthidin is left behind in the tared cap-

sule. This is dried at about 65° and weighed. By multiplying the resulting weight of the strophanthidin by 2.74, the amount of strophanthin originally present in the drug is obtained.

While Dr. Dohme cannot vouch for the absolute purity of the strophanthidin obtained in this way, he does not think that the total impurity would amount to 5 per cent. The results obtained by the three methods are as follows:

	Elborne's per cent.	Frazer's per cent.	Barclay's per cent.
S. Kombé, 1	1.155	0.99	1.08
S. Kombé, 2	1.200	—	1.14
S. hispidus, 1	0.69	0.64	0.61
S. hispidus, 2	0.65	—	0.62

Drug. Circ., July, 1900, 132.

Strophanthus—Use for Preparing Arrow Poison on the Ivory Coast.—On information supplied by Dr. Mondon, Dr. E. Heckel contributes in Revue Cult. Colon. (7, 548), some interesting details concerning several medicinal and toxic plants that are employed by the natives of the Ivory Coast in Western Africa (see also *Cassia alata*, L., *C. occidentalis*, L., and *Abrus precatorius*, L.). A specimen of strophanthus was found on examination to be

Strophanthus hispidus, D. C., but with tendencies to numerous variations towards *S. minor*, Pax.; it would appear that the natives prefer to prepare their arrow-poisons from *S. hispidus* rather than from *S. gratus*, Frauchet, which is considered more potent. They know well how to treat the plant so as to increase its toxicity, by grinding the leaves and seeds together with banana flowers, and allowing the mixture to ferment. The resulting paste is used for poisoning arrows, either for war or the chase.—Pharm. Journ., Oct. 20, 1900, 439.

SAPOTACEÆ.

Caoutchouc—Yield and Quality from Different Plants and by Different Methods.—Dr. Axel Preyer describes the properties of the various kinds of caoutchouc obtained from the latex of the leaves of trees of different botanical origin and by different methods, viz., by desiccation, by heating, by the aid of chemical coagulating agents, or best, by simple spontaneous coagulation. The caoutchouc obtained from *Ficus elastica* and *Urceola esculenta* is viscous, non-elastic, capable of being drawn out into a thread; that from *Manihot glaziovii* is soft, plastic, not viscous, easily torn; *Hevea brasiliensis* yields good caoutchouc, non-viscous, elastic; while the leaves of *Castilloa markhamiana* and *Landolphia kirkii* contain so little latex that it has not been possible to obtain sufficient caoutchouc from them to judge the quality. All the leaves mentioned yield a latex which by spontaneous coagulation produces caoutchouc more quickly than does the latex from the trunks. The conclusion is that the latex of leaves contains sub-

stances capable of inducing coagulation. Some experiments recently performed in Ceylon with *Hevea brasiliensis* apparently show that the cultivation is unprofitable, since a million trees per hectare produced at the age of eighteen months only 27 kilogrammes of caoutchouc, owing to the rapid coagulation of the latex before it could be drawn from the leaves. Manual pressure was used, but even if mechanical pressure doubled the yield the cultivation would still be unremunerative. The author, furthermore, has compared the yield of caoutchouc from *Ficus elastica* and *Castilloa elastica* at Subang, in Java, and finds that the latter tree produces a larger quantity, with a higher market value, than the former. A plantation of 40 hectares of *Ficus*, dating back to 1864, and cultivated since 1881, has produced caoutchouc during the last seven years at the rate of 600 grammes per tree per year, valued at five florins per kilogramme. The quantity obtained from each tree varies considerably between 100 grammes and 12 kilogrammes; this last phenomenal yield was obtained in one year, quite unaccountably, from trees that were tapped in exactly the same way as others that gave a smaller yield. The *Castilloa* plantation of trees only eight years old yielded on an average 200 grammes of caoutchouc per tree per year, the greatest yield from one tree being 2 kilogrammes. Hence *Castilloa* has the advantage in respect of its greater yield and higher value, added to which the trees under observation were much younger than those of *Ficus*.—Pharm. Journ., Oct. 27, 1900, 464; from Tropenpflanzer, 9, 428.

Rubber—Botanical Source and Supply from the Amazon Valley.—Vice-Consul Temple reports that according to estimates more than one-half the world's supply of rubber — which is about 120 to 130 million pounds — is exported from the Amazon district, and yet is not equal to the demand. The chief source from which rubber is collected in the State of Amazonas is the Seringueria (*Hevea brasiliensis*), while in the State of Ceará the *Manihot glaziovii*, known locally as "maniçoba," is fairly extensively worked, and in the State of Maranhao the *Hancornia speciosa* or "mangaberia" is beginning to give results. The *Hevea brasiliensis* is found scattered through the forests on the banks of the Amazon river and its tributaries, and in some parts, for no apparent reason, is much commoner than in others, very large tracts of forest existing where it either is not to be found, or is very scarce. It is generally met with in the swampy parts of the forest. The proportion of *Hevea brasiliensis* to other trees existing in the forest is difficult to ascertain, but Vice-Consul Temple thinks that for districts where it is fairly plentiful, and for areas of 1,000 acres or more, about one tree to every two acres may be taken as a fair estimate. —Pharm. Journ., Aug. 4, 1900, 180.

Rubber — Origin and Sources. — Geo. T. Branch read an interesting paper on the origin and source of rubber before the Pharmaceutical Society of Cape Colony, which may be consulted in Pharm. Journal, Jan. 26, 1901

(84–86). It may suffice here to state that the author enumerates four familiar plants as contributing to the supply of rubber, viz., (1) Artocarpaceæ; (2) Sapotaceæ; (3) Apocynaceæ; (4) Moraceæ. Of the sixty species of plants yielding rubber, many yield an inferior article, which, however, is frequently utilized for the adulteration of the better sorts.

Balata Gum—Method of Purification.—G. Arends finds that balata gum may be purified and employed for pharmaceutical purposes in the same way as gutta-percha, which it resembles very closely. The balata is first boiled with acidulated water, well washed, dried and dissolved in a mixture of equal parts of petroleum ether and tetrachloride of carbon. The solution is allowed to clarify by subsidence, the clear liquid decanted into a retort containing a little water, and the solvents are distilled. The residual gray-white mass is boiled with water to remove the last traces of the solvents, is then well kneaded, and rolled into cylindrical pieces.—Pharm. Centralh., Oct. 18, 1900, 631.

Hevea Brasiliensis—Character of the Latex and Preparation of the Rubber.—Vice-Consul Temple states that the latex of the *Hevea Brasiliensis*, from which the rubber of commerce is manufactured, is a milky juice contained in special tubes running amongst the other tissues of the plant. It is said to be quite different from the "sap," and is thought to play no part in the nutrition of the tree, being, in the opinion of some authorities, a reserve of water to be drawn upon in cases of drought. The statement that the trees are "bled" to death is said to be a mistake, as the actual extraction of latex cannot kill the tree. As a matter of fact, trees exhausted so as to yield no more latex are common, but dead trees killed by over-tapping are rarely met with. The latex as it exudes from the bark is of a dazzling whiteness, resembling milk, both in appearance and composition, inasmuch as it consists of an emulsion in which "caoutchouc" takes the place of the "butter" in ordinary milk. The fluid part of the latex consists of water, with very small quantities of albuminous matter, organic acids and phosphates in solution. The only method of preparing rubber for commercial purposes that has met with practical success is that of evaporation, the watery portion of the latex being driven off and the caoutchouc remaining. The object aimed at is to leave as little water and proteid matter in the caoutchouc as possible, otherwise putrefaction commences and so decreases its elastic properties and also its market value. The method followed in the Amazon district is to light a fire upon the ground and to invert over it a specially-constructed funnel-shaped chimney. The nuts of the "Urucury palm"—*Attalea excelsa*—are sometimes used as fuel, their smoke, containing a trace of acetic acid and creosote, being found particularly effective in curing the rubber and preventing putrefaction. Only a small proportion of the rubber coming from the Amazon district, however, is thus cured, the rubber-cutter preferring to use wood chips, which he can procure with less

trouble. A hot fire having been made, the operator seats himself by the side of the chimney with a paddle-shaped piece of wood in one hand and a small calabash in the other. The latter is dipped into a basin containing the latex, and a small quantity is poured over the paddle, which is then revolved in the smoke. That having dried in a layer over the paddle, the operation is repeated, a "ball" or "biscuit" of solid rubber being thus formed. The rubber is sometimes adulterated by the collectors with the latex of a tree called "Maçaranduba"—*Mimusops elata*—and more often that of a tree named locally "Amapá." In both cases the adulteration is extremely prejudicial to the quality of the rubber produced.—Pharm. Journ., Aug. 18, 1900, 233.

Sapium—Rubber-Yielding Species.—Some years ago, Mr. R. Thomson, who was formerly at the Botanic Gardens, Jamaica, brought to England some leaves of a species of *Sapium* from the United States of Colombia, which he said yielded a very valuable india-rubber. The plant which yielded the best, or "Colombian Virgen," has recently been described in the "Icones Plantarum," Pl. 2,647, by Mr. Hemsley, under the name of *Sapium verum*. Mr. Thomson's statements appear to have led to a careful examination of the various species nearly allied to *S. biglandulosum*, but which have hitherto, for want of perfect material, been referred to that species. Another species of *Sapium* is described in the same work, plate 2,649, under the name of *S. jenmani*, Hemsl. This species appears to extend from the United States of Colombia to British Guiana, whence specimens were sent by Mr. Jenman to Kew. This plant, according to Mr. Thomson, yields an abundance of rubber, but it is of inferior quality. According to specimens of the leaves of these plants presented to the Museum of this Society, in 1891, the leaves of the virgen rubber plant are elliptic-oblong, about nine inches long and four inches broad, leathery, with many lateral veins, and rounded at both base and apex, and have two small subglobular glands near the top of the leaf-stalk, which is two inches long. In *S. jenmani*, the leaves are the same length but thinner, and only two and a half inches wide in the middle, and the apex is acuminate with an obtuse point.—Pharm. Journ., Nov. 10, 1900, 511.

ERICACEÆ.

Rhododendron—Poisonous Effect on Cattle.—R. S. Green narrates a case of poisoning by rhododendron loppings, two heifers which he had to treat having got access to the poisonous leaves, of which they were seen to be freely eating, and from which they were not hindered, as the poisonous nature of the plants was not recognized. Although at first in a very critical condition they eventually recovered under treatment, which included enemata and the administration of chloral hydrate and castor oil. —Pharm. Journ., Mar. 9, 1901, 289; from Vet. Record, *13*, 419.

COMPOSITÆ.

Baccharis Cordifolia, Lam.—Presence of a Poisonous Alkaloid.—It is stated in "E. Merck's Annual Report" (1900), that the herbaceous portion of *Baccharis cordifolia*, Lam., a native of Argentina and Uruguay, contains an extremely poisonous alkaloid, "baccharin." The physiological activity of this alkalaid remains to be investigated. The plant is locally known as "mio-mio."—Pharm. Ztg., Mar. 6, 1901, 196.

Echinops—New Toxic Alkaloid in the Seeds of Various Species.—Greshoff has isolated from the seeds of various species of *Echinops* a new toxic alkaloid, which he has named

Echinopsine.—It has a composition corresponding to the formula $C_{11}H_9NO$, and crystallizes in two forms, the one containing one molecule of water, in rhombic needles, the other, anhydrous, in needles; the latter melts at 152° C. It dissolves in 60 parts of water, in 600 parts of ether, and in 10 parts of chloroform. The solutions are optically inactive. A series of crystalline salts have been obtained, the picrate melting at 215° C., the double mercuric hydrochloride at 204° C., and the mercuric iodide compound at 178° C. Besides echinopsine, the author has found other alkaloids, β-echinopsine melting at 135° C., echinopseine and echinopsfluoresceine.—Pharm. Journ., May 11, 1901, 589; from Chem. Centralblatt, 72, 784.

Insect Powder—Modification of Durrant's Method of Assay.—The method of assaying insect powder recommended by Durrant is modified by Fromme as follows: Macerate 8 Gm. of insect powder for an hour with ether, 80 Gm., with frequent agitation. Then draw off 50 Gm., add water, 1 Cc., and thoroughly shake. Filter, and wash the filter well with ether, then put all in a suitable flask, and distil off the solvent. Half-opened buds give about 6–7 per cent. of extract; unexpanded buds, 7.5–9.5 per cent. The ether extract of pure flowers is of a golden-yellow color, while that of the stalks has a greenish tint, so that adulteration by this means can be easily detected.—Pharm. Post, 1900, 746.

Senecio Jacobœa—Physiological Action.—J. M. Bunch finds that the injection of small doses of the alcoholic extract of the entire plant of the ragwort into the circulation causes general rise of blood pressure, with constriction of the peripheral vessels, and of the vessels of the intestinal area, while the heart contractions are lessened. Large doses cause a fall of general blood pressure, with dilation of the intestinal vessels, and inhibition of peristalsis. The entire plant, therefore, appears to contain two active principles. The portion of the alcoholic extract which is soluble in water does not contain the body which causes the rise of blood pressure. —Pharm. Journ., Sept. 1, 1900, 161; from Brit. Med. Journ., 2, 1900, 212.

Sunflowers—Cultivation for Seed in Russia.—Consul-General Smith reports that sunflower cultivation is a growing industry in Russia, there

being an increasing demand for oil-yielding seeds. It appears also that the seed is much liked as a light refreshment of the poorer Russians, and it is sold in the streets by hawkers as nuts are elsewhere. The best results in sunflower cultivation are obtained from a well-tilled soil, with not too much clay in its composition. The soil is well ploughed in the autumn and harrowed in the spring, the seed being sown in April or May, either in every second or third furrow, or, if sown broadcast, care must be taken that only one seed falls in every two square feet. About 20 lbs. is required per acre, the yield, if good, being about 1600 lbs. The yield in oil is 17 per cent. of the seed in husks, or 20 per cent. without husks.—Pharm. Journ., Oct. 27, 1900, 472.

VALERIANACEÆ.

Valerian—Formation of Acid Due to an Oxydase.—T. Carter shows that the formation of the volatile acid in the root of *Valeriana officinalis* is due to the action of an oxydase, which may be precipitated from the juice of the fresh root by the addition of alcohol. A portion of the fresh juice of the root, heated to destroy the ferment, does not develop the characteristic odor, which, as is well known, develops in fresh roots only as the root dries, while another portion of the same juice not so heated gradually acquires the smell of valerianic acid. Furthermore, if a little of the ferment precipitated by alcohol be added to the juice previously freed from oxydase by heating, it also will develop the valerianic odor.—Pharm. Journ., Sept. 22, 1900, 337 ; from Jour. Pharm. Chim. (6), *12*, 148.

RUBIACEÆ.

Cinchona—Test of Formation of Alkaloids—J. P. Lotsy has made a series of observations for the purpose of determining the place of formation of the alkaloids in *Cinchona succirubra* and *ledgeriana*. He finds that the sieve-tubes and the food-reserve tissue of the seeds contain no alkaloids ; they appear in the cotyledons only after these organs become green. The meristematic tissue is also free as long as it is in an active condition. On the other hand, the alkaloids are always found, at least at certain times, in the parenchymatous cells of the cortex, wood, and leaves, whence, on the death of the cells, they can be absorbed into the cell-walls. But otherwise the alkaloids are always in solution in the cell-sap of the living cells ; or, in older cells, of the secondary cortex, as amorphous solid bodies stored up in the cell. After they form a combination with tannin, the raphid cells are always free from alkaloids. The largest quantity is contained in the cortex ; the primary cortex, which possesses but few sieve-tubes, containing more than the secondary cortex, which possesses many. The author's observations led him to the conclusion that the cinchona alkaloids are formed in the leaves, whence they travel to the stem, and are there stored up, either in their original form or after trans-

formation into some other alkaloid. They do not arise as products of decomposition of proteids, but by direct synthesis, as the results of the reaction of cinchonic acid on ammonia or a compound of ammonia and subsequent condensation.—Pharm. Journ., Dec. 15, 1900, 689; from Bull. Inst. Botanique Buitenzorg, *3*, 1900.

Spurious "Quinine Bark"—Description and Chemical Examination.—E. W. Pollard gives a description of the pharmacognostic, microscopic and microchemical features of a so-called "Quinine Bark," handed to him by Mr. E. M. Holmes for this purpose, which had been imported from the United States of Colombia and offered in the London market as containing 5 per cent. of quinine. The bark occurs in pieces about 10 Cm. long; some were rolled tightly, while others were nearly flat. The maximum thickness was 2 Mm. The exterior is greyish, with cells of *Protococcus* attached, but no lichen. Transverse furrows were present in some pieces, and longitudinal striæ in all. The outer bark easily scaled off, leaving a dull brown inner bark. The inner surface was smooth, and in color varied from chocolate to walnut. The bark breaks with a short fracture, not having a fibrous character. It is easily reduced to coarse powder, but the reduction to fine powder is difficult, owing to groups of stone cells. There is no well-marked odor, though an aroma is given off when the bark is boiled with water. The taste of the bark is very bitter, and when moistened with strong sulphuric acid it assumes a brilliant red color. For the microscopic elements and the illustration accompanying the test, the original paper must be consulted. The chemical examination determined the absence of an alkaloid. It contained, however, a glucoside, a bitter principle, traces of tannin, and starch. In a note, the editor of the Ph. Journ. observes that in other hands the bark was found to contain about 0.06 per cent. of a very bitter alkaloid, which produces a crystalline sulphate, but is not a cinchona alkaloid. Mr. Pollard's material was evidently insufficient for this determination.—Pharm. Journ., April 20, 1901, 492.

Comoro Coffee—Absence of Caffeine.—Comora Coffee, which was discovered by Humboldt and named by Baillon

Coffea humboldtiana, was subsequently considered by Froehner to be simply a variety of *Coffea arabica*. Gabriel Bertrand has now examined comoro coffee seeds and finds them to be devoid of the least trace of caffeine. He points out that the absence of caffeine cannot be attributed to the external influences of climate and environment, since *Coffea arabica*, wherever cultivated, always yields seeds containing that alkaloid. The results of chemical analysis therefore confirm the provisional diagnosis of Baillon, and establish the fact that *Coffea humboldtiana* is a distinct species.—Pharm. Journ., Febr. 9, 1901, 135; from Compt. rend., *132*, 162.

Ipecacuanha—Alkaloidal Constituents, etc.—Dr. B. H. Paul and A. J.

Cownley, in a comprehensive paper on the chemistry of ipecacuanha, observe that this drug is probably, next to opium and cinchona bark, one of the most important ones in the official Materia Medica. Its chemical history, however, has been for a long time very imperfect, and although some of its medicinal effects have been ascribed to the presence of an alkaloid, there has been hitherto considerable doubt whether that was always the case. In prosecuting an inquiry as to the amount and nature of the alkaloid to which the name emetine has been given, the authors, of course, consulted the observations of previous experimenters—Pelletier, Magendie, Calloud, Merck, Reich, Leprort, Glènard, Podwyssotski, Lefort, Wurtz, etc.—but instead of deriving much assistance from the statements of their results (which are reviewed in some detail), they found that they led to considerable uncertainty respecting the chemical identity of the alkaloid described as emetine. In none of the memoirs referred to is there any statement as to the kind of ipecacuanha operated on, and it is probable that some of the discrepancies they present may be ascribed to differences in the drug examined. The general probability that ipecacuanha might contain more than one alkaloid was recognized by Glènard as well as by Lefort and Wurtz, but in neither case was any definite conclusion arrived at on that point, so that the alkaloid obtainable from ipecacuanha has hitherto always been regarded as one substance, having distinct chemical individuality. Moreover, the failure of most previous observers to arrive at correct conclusions in regard to the ipecacuanha alkaloids, gives evidence how largely the results of such investigations may be influenced by accidental circumstances. Thus Lefort's method of extraction with chloroform in the presence of caustic potash furnished a product consisting of an uncertain mixture of alkaloids, while Podwyssotski's result obtained by employing ferric chloride to remove the tannin was vitiated by using petroleum spirit for extraction. On the other hand, Glènard was more fortunate in his investigation, because he exercised care to obtain the alkaloid in the state of a crystalline neutral hydrochloride, after extraction by treatment with lime and ether. As a consequence of this method of treatment, the cephaeline was eliminated, emetine was isolated in a pure condition, and indications of the existence of another alkaloid, although not followed up by Glènard, the results of whose analyses correspond very closely with those of the present authors.

In their examination of the alkaloids of ipecacuanha the authors employed the Brazilian variety in the first instance. The extraction was carried out in the following manner: A quantity of the drug was extracted with cold alcohol, the alcoholic percolate mixed with basic lead acetate, filtered, and the excess of lead removed with dilute sulphuric acid. The filtrate was neutralized, the alcohol distilled, and the clear residual liquid shaken out with ether and ammonia. The ether solution was next shaken out with weak sulphuric acid and the acidulated solution repeatedly shaken

with caustic soda, in the presence of ether, until *cephaeline*, the base soluble in caustic alkali, had been completely separated. The base, insoluble in weak caustic alkali, was then converted into hydrochloride and the salt crystallized from water. Finally, the base (*emetine*, Rep.) was precipitated by ammonia. The third alkaloid, which the authors have named *psychotrine*, was obtained by extracting with chloroform the ammoniacal liquid from which emetine and cephaeline have been separated by ether. The cephaeline is obtained from the caustic soda liquor by neutralization with acid and then shaking out with ether and ammonia. In the examination of New Grenada ipecacuanha the powdered drug was mixed with lime and extracted with amylic alcohol, from which the bases are then separated after the manner before described. The complete separation of cephaeline by treatment with caustic alkali is important, in order to obtain the crystalline emetine hydrochloride more readily. The following are the more important characters of the three alkaloids revealed by the present investigation:

Emetine is apparently an amorphous base and almost colorless, but becomes yellowish on exposure to light. It melts at about 60° C., is strongly alkaline to litmus, neutralizes acids completely, and is readily soluble in alcohol, ether, chloroform or benzene, but only sparingly soluble in water or in hot petroleum spirit. It is insoluble in solutions of caustic alkali, and is thus distinguished from cephaeline. Ultimate analysis gives figures agreeing closely with Glénard's formula, viz., $C_{15}H_{22}NO_2$ or $C_{30}H_{44}N_2O_4$.

Emetine Hydrochloride is readily obtained in radiating groups of silky filaments by simply evaporating the aqueous solution, and crystallizes with even greater facility in the presence of excess of acid. The salt is rendered anhydrous at 100° C., and then has the composition $C_{15}H_{22}NO_2HCl$, or, if the base is considered bivalent, $C_{30}H_{44}N_2O_4 2HCl$. The greater ease with which this salt crystallizes from acid solution suggested the possibility that an acid salt was formed, but such was found not to be the case.

Emetine Hydrobromide is obtained either by double decomposition between the hydrochloride of the base and potassium bromide, or by neutralizing the base with hydrobromic acid, and is now prepared on a commercial scale. It crystallizes in tufts of silky needles, and contains 2 mol. H_2O if the base is considered monovalent, or 4 mol. if bivalent. The salt is permanent, undergoing no change after several months, and is readily soluble in water, though less so than the hydrochloride, and difficultly soluble in absolute alcohol or in chloroform.

Numerous other salts—the hydriodide, nitrate, chromate, picrate, ferricyanide, sulphate, acetate and oxalate, and the double salts of platinum, of mercury and of gold, were also obtained and are briefly characterized.

Cephaeline is colorless when first obtained, but, like emetine, it acquires a yellow color on exposure to light. It is very much less soluble in ether than emetine, but separates from its ethereal solution in bunches of deli-

cate silky needles, which form more readily in the presence of water. Obtained in this way, cephaeline melts at 96°–98° C., while when the crystallization is effected by the addition of ammonia to a salt in the presence of ether, the crystals melt at about 102° C. Analyses of the anhydrous base gave figures which correspond to the formula $C_{14}H_{20}NO_2$ or $C_{28}H_{40}N_2O_4$.

Cephaeline Hydrochloride, like the corresponding emetine salt, crystallizes more readily in the presence of excess of acid. The crystals are fine transparent rhombs, and contain 3 or 6 mol. H_2O, according to the assumption of the mono- or bi-valent function of the base.

Psychotrine exists in ipecacuanha in very small amount, relatively, to emetine and cephaeline, and it differs from these alkaloids in being very sparingly soluble in ether. It is a crystalline alkaloid which separates from ether in well-defined transparent prisms of a lemon-yellow color. It melts at 138° C., neutralizes acids, and apparently has a much higher molecular weight than either emetine or cephaeline. It dissolves readily in alcohol or chloroform, the solution becoming dark-colored on exposure to light and depositing a dark-brown substance. The quantity obtained was too small to allow of complete examination.

The statements made by some observers, that ipecacuanha root which has been deprived of its alkaloids has a greater therapeutic value in the treatment of dysentery, require to be received with doubt, inasmuch as the so-called de-emetinized ipecacuanha has been found by the authors not to be entirely free from alkaloidal content. Some attempt has been made by them, however, to isolate and study a

Saponin-like Constituent obtained from the basic lead precipitate resulting in the course of the separation of the basic constituents by the method initially described. This constituent has no emetic action in doses of 0.25 Gm. Finally, have given some attention to the

Pharmacology of Emetine and Cephaeline, the necessary experimental investigation having been carried out by Dr. R. B. Wild, of Owens College and the Victoria University, Manchester. Employing the hydrochlorides of the two bases, it was found that emetine and cephaeline both possess powerful emetic action; but the emetic dose of emetine was double that of cephaeline, and, per contra, the nausea produced by cephaeline is double that of emetine. Emetine may become most useful as a good expectorant, while cephaeline, which acts powerfully in doses of 10 to 20 Mgm., is undoubtedly superior as an emetic. From these observations of Dr. Wild it follows that ipecacuanha for pharmaceutical purposes must be regarded from the nature and the amount of emetine and cephaeline rather than from its botanical source. The results of analyses of selected samples of the two kinds of ipecacuanha investigated, given in the following table, show that, although the total amount of alkaloid in the two kinds does not differ materially, the preparations of emetine and cephaeline are so different that the two drugs cannot be regarded as interchangeable.

	Brazilian.				Columbian.	
	Root.		Stem.			
	Percentage in root.	Percentage in total alkaloid.	Percentage in stem.	Percentage in total alkaloid.	Percentage in drug.	Percentage in total alkaloid.
Emetine	1.45	72.14	1.18	65.6	0.89	40.5
Cephaeline ...	.52	25.87	.59	32.8	1.25	56.8
Psychotrine ..	.04	1.99	.03	1.6	0.06	2.7
Total alkaloid.	2.01	100.	1.80	100.	2.20	100.

The method of analysis adopted by the authors is given in detail, but must be referred to in the original paper.—Amer Jour. Pharm., Feb. and Mar., 1901, 57–66 and 107–116.

Ipecac—Comparison of Methods of Assay.—I. V. S. Stanislaus has tried different methods for the assay of ipecac root and finds Keller's method to excel, not alone in simplicity and celerity, but also in exactness. In conducting his experiments, the author carried out this process as follows: 12 Gm. of the dry powdered root is covered with 120 Gm. of ether (sp. gr. 0.72), after maceration for five minutes 10 Cc. of ammonia water is added, this mixture well agitated and left to rest for thirty minutes, 10 Cc. of water is added and the mixture agitated until the upper ethereal layer is perfectly clear. 100 Cc. of this upper layer is now decanted, and alkaloid shaken out with three successive portions of 1 per cent. HCL (I. 25 Cc.; II. 15 Cc.; III. 10 Cc.). The so obtained three acid solutions are mixed and filtered into a dry Erlenmeyer flask, deprived of solvent by distillation, and of traces of ether by current air, and the result weighed. This, multiplied by ten, will give percentage of emetine present.

Keller also introduces another improvement to the above method. For every 5 Gm. of the root employed from the total alkaloids he deducts 0.0123 Gm. The remaining alkaloid is mixed with 10 Cc. of alcohol, and water is added until perfect clearness results; a few drops of a one per cent. solution of hæmotoxylin solution is now added, and this titrated with decinormal solution of H_2SO_4. Each Cc. of the acid indicates 0.0254 Gm. of emetine presont.

Compared with other methods, the following mean results were obtained respectively:

(A) Keiler's method, mean of five assays, 2.9870 per cent.

(B) Dragendorff's method, mean of five assays, 1.4203 per cent.

(C) Dragendorff's method, modified by W. H. Snow, mean of five assays, 1.3901 per cent.—Proc. Indiana Pharm. Assoc., 1900, 61–64.

(D) British Pharmacopœia, mean of five assays, 1.3033 per cent.

Ipecacuanha—Alkaloidal Value.—Cæsar and Loretz report the result of a large number of assays of ipecacuanha, made according to the method of Keller, but using ether instead of the ether-chloroform mixture directed. The alkaloids were weighed and titrated in each case, with identical results in the two figures so obtained. In 19 lots of Rio ipecacuanha the alkaloidal content ranged from 2.28 to 3.36 per cent., while 48 lots of the Carthagena drug showed a range of 2.31 to 3.45 per cent. of alkaloid.—Pharm. Rev., November, 1900, 523; from C. & L., Geschaeftsber., September, 1900.

Carthagena Ipecac—Alkaloidal Value.—Charles H. La Wall and Robt. C. Pursel report the results of assay of twenty consignments of Carthagena ipecac, representing about 3,000 pounds, as follows:

	Total Alkaloid, Moist. per cent.	Moisture. per cent.	Total Alkaloid in dried drug. per cent.
Minimum	1.85	3.18	1.92
Maximum	2.29	4.40	2.40
Average	2.03	3.87	2.11

These figures show the Carthagena root, which had formerly been excluded by the U. S. Customs authorities under the belief that it was an inferior variety of ipecac, to be in fact richer in total alkhloids than the Rio drug. No investigation has been made, however, to determine the proportion of the several alkaloids in order to determine whether the two varieties agree in this respect.—Proc. Pa. Pharm. Assoc., 1900, 160.

CAPRIFOLIACEÆ.

Viburnum Opulus—Proximate Examination of the Bark.—N. R. Gibson has subjected cramp bark to proximate analysis with the following results:

Moisture in air-dried drugs	6.92 per cent.
Ash	5.52 per cent.
Organic constituents	87.56 per cent.
Inorganic constituents	{ Earthy carbonates and phosphates.
Resin	5.271 per cent.
Waxy matter	6.342 per cent.
Organic acids	9.431 per cent.
Glucose	Undetermined.
Sodium hydroxide extractive	36.62 per cent.
Cellulose	15.808 per cent.
Colored extractive	4.378 per cent.
Loss	22.15 per cent.

The author believes the active principle of this bark to be a glucoside.

It is of a resinous character, greenish or greenish-yellow in color, slightly soluble in water, and completely soluble in alcohol.—Proc. Indiana Pharm. Assoc., 1900, 112–117.

LORANTHACEÆ.

Viscum Album—A Useful Caoutchouc-Like Constituent.—According to Riehl a substance analagous to caoutchouc obtained from the white mistletoe (*Viscum album*), called

Viscin, is extremely satisfactory for the manufacture of plaster basis and for the incorporation of powdered medicaments, as it does not irritate the skin. The color and odor are somewhat against it, otherwise the therapeutic results are very satisfactory.—Pharm. Journ., Feb. 16, 1901, 167; from Wien. Klin. Runds., *44*, 888.

UMBELLIFERÆ.

Asafetida—Improved Pharmacopœial Description.—Caesar and Loretz (Bericht., September, 1900) regard the description of color of asafetida—yellowish-violet or brown—of the Germ. Phar., IV., as being more correct than that of the Germ. Phar., III., and regard with favor also the admission of 10 per cent. ash instead of 6 per cent. formerly designated. The drying over lime, for the purpose of powdering the asafetida, is also a step in the right direction.—Phar. Centralh., Oct. 18, 1900, 634.

Asafetida—Commercial Quality.—M. J. Wilbert observes that, although asafetida has long been used extensively as an antispasmodic and carminative, it has of late years come into prominence on account of its value in relieving the flatulence that usually follows as a sequel to abdominal operations. Having occasion to handle a considerable quantity of this drug, for the manufacture of the various preparations, the author has at times been perplexed by the difficulty of procuring a satisfactory supply. Examinations in almost every instance proved the commercial drug to fall decidedly below the pharmacopœial requirement in the amount of alcohol-soluble material, as is shown in the following table, giving the results of recent examinations, with prices asked for the various sorts indicated:

No.	Source and Description.	Alcohol Soluble.	Insoluble.	Ash.	Price.
1	Loose tears, New York	70.1	29.9	7.2	$0.55
2	Lump, Philadelphia	44.3	55.7	34.2	.30
3	Choice gum, New York	41.4	58.6	35.8	.45
4	Mass tears, New York	36.4	63.6	45.1	.43
5	Lump, New York	31.2	68.8	51.9	.36
6	Lump, Philadelphia	30.2	69.8	50.6	.32
7	Powdered, New York	28.5	71.5	46.6	.39
8	Powdered, Philadelphia	19.8	80.2	60.6	.35
9	Soft mass, New York	18.3	81.7	62.1	.40
10	Old gum, Philadelphia	40.5	59.5	45.9	?

No. 1, as received, was mixed with date stones, small pieces of stone, masses of hair, pieces of sacking, sections of roots, etc., and from this lot clean tears were selected for the experiment. In conducting the experiment the drug was first coarsely comminuted, digested in alcohol, the liquid passed through a tared filter, the residue rubbed to a paste, digested with a fresh portion of alcohol in a warm place, the whole then collected on a tared filter, and this washed until the washings passed odorless and no longer produced turbidity in the water. The residue and filter were dried to constant weight. An aliquot portion of this residue was then incinerated to obtain the percentage of ash in the drug. It is noteworthy that price is no indication of quality, the present sample, No. 9, being above the average in price, while the best in quality, No. 2, happens to have been the lowest in price.—Amer. Journ. Pharm., Mar., 1901, 131–135.

Asafetida Preparata—A Possibly Useful Preparation.—Hy. Williams Jones, trying various methods of purifying asafetida, conceived the idea of precipitating a strong alcoholic solution in water, securing thus a product containing the essential ingredients of the drug—the resin and volatile—and eliminating the impurities with the non-essential gummy constituents. The crude undried drug is dissolved in 5 fluid parts of alcohol (90 per cent.) in a closed jar by the aid of a little heat from the water-bath, the solution cooled, filtered, and poured into 10 times its bulk of water faintly acidulated with hydrochloric acid. After 24 hours the precipitate is collected, washed, and dried by exposure to air. The product, the author thinks, would be useful for making pill masses, and the tincture.—Trans. Brit. Pharm. Conf., 1900, 503.

Heracleum Giganteum—A Gigantic Umbellifer.—F. Goldly describes and shows in photographic illustration a specimen of heracleum giganteum, cultivated by Mr. E. Harrison, of Enfield, England, which is 12½ feet in height, and gives some idea of this gigantic member of the umbelliferæ. The plant is said to attain a height of 15 feet, and is stated to rival the *Ferula communis* in size. It is very common on the islands of the Sea of Marmora.—Pharm. Journ., July 14, 1900, 35.

RANUNCULACEÆ.

Aconite—Examination of Product of Assay.—In a previous paper (see Proceedings, 1900, 616), A. R. L. Dohme had demonstrated that aconite was perfectly amenable to chemical assay and required neither the physiological test by the tongue nor that of the gram-frog lethal dose. The author has now, in collaboration with H. Engelhardt, made a series of experiments, undertaken with the object of placing the reliability and trustworthiness of Dr. Dohme's modification of Keller's assay method beyond doubt, by proving that the product of assay was aconitine and not any of its decomposition products. Finding the quantity of material from

the two previous assays insufficient to permit satisfactory crystallization, the authors operated on larger quantities of the same aconite root as that used in the previous assays cited, and obtained, in each case, after recrystallizations, a good crop of crystals possessing a white color. The crystals obtained by method one (Keller's original ? Rep.), melted at 179° C., and 177° C., in two determinations; those obtained by method two (Keller's Modified ? Rep.) melted at 195° C., and 194° C., in two separate determinations. This indicates conclusively that by method two at any rate, and to a very great extent by method one as well, the product of the aconite assay is aconitine.—Drugg. Circ., July, 1900, 132.

Delphinium Staphisagria—Investigation Concerning the Alkaloidal Constituents of the Seed.—See *Delphinine* under "Organic Chemistry."

BERBERIDEACEÆ.

Berberis Vulgaris—Morphological and Pharmacognostic Description.—G. Pinchbeck communicates a monograph on *Berberis vulgaris* in which he very exhaustively describes the morphological and pharmacognostic characters of the drug, aided by numerous illustrations. See Pharm. Journ., March 2, 1901, 262–264, and April 6, 1901, 427–429.

RUTACEÆ.

Jaborandi Leaves—Varieties and Characters of Distinction.—Dr. E. M. Holmes mentions the following varieties of jaborandi leaves, and such as have been represented under that name, which have appeared in the English market, and describes their characters of distinction from specimens in the Museum of the Pharmaceutical Society:

Pernambuco or Genuine Jaborandi (*Pilocarpus jaborandi*).—Leaflets elliptic oblong, slightly unequal at the base, coriaceous, brownish-green, with the veinlets distinctly prominent on the upper surface, more or less rounded at both ends, and only slightly hairy along the principal veins below.

Rio or Paraguay Jaborandi (*Pilocarpus pennatifolius*), Lem.—Leaflets thinner, subcoriaceous, grayish-green, with the veinlets not prominent on the upper surface, almost glabrous, usually tapering and nearly equal below. The plant is figured in Bentley and Trimen's "Med. Plants," No. 48, but the fruit there shown belongs to *P. jaborandi*. The fruits are quadrate and smaller than those of *P. jaborandi*.

Ceará Jaborandi (*Pilocarpus trachylophus*).—Leaflets brownish-green, with prominent veinlets on the upper surface, yellowish, with abundant curved three-celled hairs on the under surface, and with the margins recurved, nearly equal at the base. The fruits are crested at the back and rounded, not quadrate. The leaves do not contain pilocarpine.

Abacati Jaborandi (*Pilocarpus spicatus*, A. St. Hil.).—Leaves simple,

lanceolate, tapering to both ends, with a short petiole, which is twisted to one side. Subcoriaceous and hairy; the midrib projecting on both surfaces, the network of veinlets prominent on the under surface. In this species the leaves are not pinnate.

Maranham or Small Jaborandi (*Pilocarpus microphyllus*, *Stapf.*).—Leaflets subcoriaceous, thin, rarely exceeding an inch in length, rounded above, but tapering somewhat below, and dark green, the midrib more prominent above than below; round oil glands easily visible under a lens.

False Maranham Jaborandi (*Swartzia decipiens*).—The leaflets of this leguminous plant closely resemble those of *Pilocarpus microphyllus*, but the under surface of the leaves is minutely reticulated, as seen under an ordinary lens, and round oil-glands are entirely absent. In some of the leaflets the veinlets are translucent, in others not so, so that two species may possibly be mixed together in the commercial article. The lower leaves are much smaller and nearly circular; these are often found mixed with the ordinary leaves.

False Rio Jaborandi (*Piper species*).—The leaves are broadly lanceolate, gradually tapering to both ends, thin, grayish-green, with extremely minute oil-glands visible only under a high magnifying power, and are generally mixed with pieces of the stem having the swollen joints characteristic of the genus *Piper*. They bear no resemblance to true jaborandi leaves.

The author gives a microscopical description of the Museum specimens, which is profusely illustrated, and may be consulted in Pharm. Journ., Feb. 23, 1901, 199–201.

Jaborandi—Commercial Varieties and their Alkaloidal Constituents.—According to H. A. D. Jowett the leaves of Pernambuco or true jaborandi (*Pilocarpus jaborandi*, Holmes) are now extremely scarce, the leaves at present on the market being chiefly those of the Paraguay jaborandi (*P. pennatifolius*, Lem.) and of the Maranham jaborandi (*P. microphyllus*, Stapf.). The leaves of these different varieties vary considerably in the amount of *pilocarpine* they contain, the percentage rarely exceeding 0.5, whilst sometimes there is none present. An isomeric alkaloid, *isopilocarpine*, is found in all the commercial varieties, but *pilocarpidine* has been found in Pernambuco jaborandi alone, and only in small quantity. *Jaborine* does not appear to exist, the commercial supply under that name consisting of coloring matter with a small quantity of the before mentioned alkaloids. An amorphous substance found in true jaborandi leaves is lacking in the atropine-like action which has been attributed to the hypothetical jaborine.

Pilocarpine, $C_{11}H_{16}O_2N_2$, is a thick syrup, which becomes thinner on warming; it is optically active and yields crystalline salts, of which the most useful are the nitrate and the hydrochloride. The nitrate is mos convenient to use in medicine, on account of its stability in air; it is

soluble in seven parts of water, but only sparingly soluble in 90 per cent. alcohol. Its melting point should be from 173° to 178° C., and its specific rotation from $-80°$ to $+83°$. Commercial nitrate contains a varying amount of the isomeric pilocarpine nitrate. The hydrochloride is hygroscopic in moist air; it is very soluble in water and also dissolves in ten parts of 90 per cent. alcohol.

Isopilocarpine can be formed by the action of heat or alkalies on pilocarpine, and is very similar to the latter in its physical and chemical properties, though it is optically inactive except in neutral solution. A small quantity of isopilocarpine is present in the leaves, but the greater portion is formed during the process of manufacture, in a similar manner to the conversion of hyoscyamine into atropine.

Pilocarpidine, $C_{10}H_{14}O_2N_2$, of which the yield is only 0.017 per cent., differs in various ways from pilocarpine and isopilocarpine; the nitrate (m. p. 137° C.) is much more soluble in alcohol or water (1 in 2) than the other nitrates, and it is absent from the pilocarpine nitrate of commerce. Prof. C. R. Marshall has studied the

Pharmacology of Jaborandi, respectively of its alkaloids. He found the heart-beats to become slower and the blood pressure fall after the injection of 0.5 to 1 Cc. of pilocarpine solution (1 in 5,000), though both gradually returned to normal after a short but variable interval, and he blood pressure sometimes rose slightly beyond the normal. During the rise of the blood pressure the vagus was generally less irritable, but on the pressure reaching its normal height the vagus became, for a short time, slightly more sensitive. The dose mentioned also produced distinct salivation in the rabbits and cats experimented upon. After injecting somewhat larger doses the heart ceased to beat for a time and then gradually returned to the normal; still larger doses stopped the heart permanently and paralyzed the respiration. By careful graduation of the dose, however, it was found possible to paralyze the vagus terminations, and larger doses could then be given without much effect upon the heart. Isopilocarpine produced a similar effect to pilocarpine, but much weaker, the relative activities of the two bases being roughly as one-eighth to one-tenth. Pilocarpidine was found to be very slightly active, in fact almost inactive. Experimenting upon himself, Professor Marshall was able to cause salivation and perspiration with the following minimum doses: Pilocarpine, 0.005 Gm.; iso-pilocarpine, 0.04 Gm.; jaborine Merck), 0.09 Gm. Pilocarpidine, 0.38 Gm., caused slight nausea, but did not produce distinct salivation or sweating. The resin of jaborandi in doses of 2 Gm. was also found to be inactive. Dr. Jowett and Prof. Marshall also conducted investigations with

Extractum Jaborandi Liquidum, B. P., in order to determine whether any active principle other than pilocarpine and its allies is present in

jaborandi leaves. They have failed to detect, chemically or physiologically, any substance antagonistic to pilocarpine, and no liquid extract examined was found to produce an atropine-like effect. When assayed, the commercial samples of extract examined yielded from 0.21 to 0.5 per cent. of "total alkaloid" which invariably contained resin, whilst the yield of crystalline nitrate (chiefly pilocarpine) did not in any case exceed 0.082 per cent. In the physiological experiments a very large dose of extract—exceeding an ounce in one case—was generally required to produce an effect, and the results are held to prove the extreme variability of the preparation, whilst casting considerable doubt on its utility as a medicine. Finally, it is stated that the inactivity of some preparations of jaborandi seems to be due to the absence of pilocarpine, and not to the presence of an antagonistic alkaloid, as was formerly considered to be the case.—Pharm. Journ, Oct. 27, 1900, 463–464; from Brit. Med. Journ., No. 2076, p. 1076.

Peganum Harmala—Alkaloidal Constituents.—O. Fischer has separated the following alkaloids from the seeds of *Peganum harmala:*

Harmine, $C_{13}H_{12}ON_2$, occurring in colorless, glossy rhombic prisms, melting at 257° to 259° C. This is converted into a phenolic base,

Harmole, $C_{12}H_{10}ON_2$, on heating it with concentrated hydrochloric acid. Next he extracted

Harmaline, $C_{13}H_{14}ON_2$, which forms large, blunt, colorless crystals, while

Harmolole, $C_{13}H_{12}ON$, is left in the mother liquor after the removal of harmine and harmaline, by treatment with alkali, and is obtained in the form of fine, brownish crystals, with a green fluorescence, which darkens at 180°, and decomposes at 212°. The alkaloids were extracted by treating the seeds first in the cold, then by warming, with very dilute H_2SO_4. Harmine and harmaline were precipitated by alkali, dissolved in sulphuric acid, and separated by fractional crystallization as hydrochlorides by means of sodium chloride. A complete series of double salts and substitution products of the alkaloids is described.—Pharm. Journ., June 29, 1901, 805; from Chem. Centralblatt., 72, 957.

Samadera Indica—Proximate Constituents.—J. L. Van der Marck has subjected the seeds, bark, root and wood of *Samadera indica* to chemical investigation. He finds in the seeds 63 per cent. of a fixed oil, composed of 87.7 per cent. triolein, 8.41 per cent. tripalmitin and 7.89 per cent. tristearin. From the bark he isolated a bitter principle, which he named

Samaderin.—It forms monclinic anhydrous crystals, having the composition $C_{29}H_{34}O_{11}$, which melt at 225° C., and are soluble in alcohol and in acetone. It is a toxic substance, causing paralysis in both warm- and cold-blooded animals. From the root and wood of the plant a second bitter principle was obtained, which is distinguished from samaderin by giving a yellow reaction with sulphuric acid, whereas samaderin gives a

violet color passing to cherry-red, with the same reagent. This second principle appears to be closely allied if not identical with quassin.—Pharm. Zeitg., Jan. 26, 1901, 75; from Nederl. Tijdschr. voor Pharm., 1900, 296.

GERANIACEÆ.

Monsonia Ovata—Proximate Constituents.— J. Gordon Sharp calls attention to a South African drug which enjoys considerable reputation as a remedy in dysentery. It is known by the native name of "Keita," and is the root of *Monsonia ovata*, a plant which is fully described in a small pamphlet published by Ludwig Pappe, M. D., in 1850, entitled "Flora Capensis Medicæ Prodomus." Mr. Sharp, having secured some of the drug, of guaranteed origin, subjected it to proximate analysis and finds it to contain: (1) Tannin of the nature of gallo-tannin with perhaps other astringent matter; (2) green coloring-matter; (3) traces of glucoside and alkaloid, but in such small quantities as to be of no importance. The author concludes that it is hardly worth while to further investigate this plant, since its virtues are apparently due solely to some astringent body. By the Kafirs it is used simply as a tea, and they have doubtless properly gauged its value. Moreover, the reports concerning its value as a remedy in dysentery are conflicting, some regarding it as a specific, while others dispute its efficiency altogether.—Pharm. Journ., Dec. 22, 1900, 727–728.

STERCULIACEÆ.

Cacao—Method of Curing in the Cameroons. — C. Bernegau gives the following description of experiments made in the German African colonies for curing cacao beans: The fresh beans, covered with banana leaves, were allowed to ferment for several days, the temperature of the surrounding air being about 38° C. After the first day there was a development of alcoholic odor, and the temperature rose to about 50° C. in the mass of beans; on the second day the alcoholic odor was very decided, and the temperature had risen to about 60° C.; on the third day the temperature had risen to 70° C., and acetification began to manifest itself; and on the fourth day there was strong evidence of acetification, and the temperature rose so high as to break the thermometer used. A portion of the beans was washed each day and dried in a Mayfarth's drying oven. The product, after two days' fermentation, was of a light color, and was the best both in taste and in flavor. The beans obtained after the third and fourth day were darker in color and inferior in flavor. The results of these and other experiments lead to the conclusion that the curing of cacao beans must be conducted under conditions of good ventilation and cleanliness of the fermenting room; the fermentation should take place at moderate temperatures so that rapid oxidation may be avoided, which may be accomplished by frequently turning the beans with the shovel, and must be intercepted with the beginning of acetification. The washing must be

in pure water, and the drying in drying-rooms heated with hot air, rather than in drying ovens, in which the temperature is liable to rise too high. Finally, the well-dried beans should be packed in clean water-proof sacks, and then stored in airy and dry compartments, both on shore and on ship-board, removed from all other odorous substances, such as fermenting palm-nuts, and other tropical products that are usually shipped in the same vessel. The author has also endeavored to utilize the pulp of cacao fruits. By boiling the fruits with water, expressing and evaporating the resulting decoction to extract consistence, a light brown gelatinous fruit sugar was obtained, which possesses a pleasant sweet and acidulous taste. A syrup, useful for making lemonade and similar beverages, may also be prepared from the fruits, and keeps well if preserved with a little alcohol. —Pharm. Ztg., Sept. 29, 1900, 756.

"Moghat Root"—Source, Character and Uses.—Dr. E. M. Holmes has for some years been in possession of a specimen of "moghat root," a drug which has enjoyed high reputation in Egypt as a "most precious medicine," but, awaiting further authentic information concerning its merits, he has hitherto refrained from publishing that gathered. He gives this now in a note, accompanied by two cuts exhibiting the general characters of the drug, from which the following may be useful here: The drug has been identified by Dr. Geo. Schweinfurth, of Cairo, as being derived from

Glossostemon Bruguierii, D. C., the distribution of which is given as (1) *South Arabia*, in the interior of Hadramaut: (2) *Mesopotamia*, in the desert around Kerkuk, and at the foot of Mount Tell Kokab, sixty or seventy miles north of Bagdad, in the Hamrir range, on barren sandstone. (3) *W. Persia*, at Dizful. These are the recorded localities where the plant has been actually found, but it doubtless occurs in many intermediate localities. Rear-Admiral Bloomfield communicated to the author the following information concerning the drugs: Portions of the roots of *Glossostemon bruguierii*, in pieces from six inches to a foot long, and of the thickness of a finger to that of a man's forearm, much resembling those of *Saponaria officinalis*, L. (Arabicé "Erk Halâwi"), which are sold with them in the bazaars of Cairo and Alexandria, are always to be found in plenty under the name of "moghât." For medicinal purposes the roots are finely powdered, and a little butter added (Arabicé "Samu") with sufficient boiling water to make a thick broth; the powdered corms of *Colchicum ritchii*, R. Br. (Arabicé "aookna" at Alexandria, and "hameera" at Cairo), a very abundant plant in the desert round Alexandria, and also in Palestine and Sinai in the months of December and January), are then added, together with the powdered seeds of *Prunus mâhaleb*, L. (Arabicé "Mâhleb"), which are common in the bazaars, and a little turmeric as a flavor. Broth so made has a very great reputation for restoring the strength and flesh of the weak and emaciated, and is invariably given to Coptic and Arabian women, of all classes, six weeks after

childbirth. One of its ingredients—the "aookna" or "hameera"—is firmly believed in as procuring the *embonpoint* so much desired by Eastern women.

From portions of branches with leaves, flowers and ripe fruit, forwarded to Dr. Holmes by Col. E. Mockler, the identification of the plant and the root with the "moghat" of the Alexandrian bazaar was pronounced to be complete at Kew, and by Dr. Schweinfurth, in Berlin.—Pharm. Journ., May 11, 1901, 593–594.

Telfairia Pedata—Yield and Properties of the Fixed Oil from the Kernels.—According to H. Thoms, the seed kernels of an East African plant, *Telfairia pedata*, yield 43.5 per cent. of a dark-colored fixed oil, which bleaches rapidly, and when filtered after several days produces a deep-yellow, fragrant-tasting product. It has the sp. gr. 0.918, dries slowly, and consists of the glycerides of stearic, palmitic, telfairic, and other unsaturated fatty acids.

Telfairic acid has the composition $C_{18}H_{32}O_2$, and belongs to the linoleic series of acids, with which it is isomeric. The pronounced taste of this oil makes it unsuitable as a substitute for olive oil.—Pharm. Journ., Aug. 4, 1900, 161; from Chem. Ztg. Report, *24*, 66.

TILIACEÆ.

Tilia Europaea—New Neutral Principle in the Bark.—W. Braeutigam has isolated from the bark of *Tilia europaea* a new neutral principle, having the composition $C_{21}H_{32}O_2$, which he names

Tiliodine. It was obtained in the form of light, brilliant scales, which are tasteless, odorless, insoluble in water, melt at 228° to 229° C., and are not affected by mineral acids at temperatures below 100° C. To obtain it, the bark is extracted with ether, the ether is distilled off, and the residue extracted with 90 per cent. alcohol, which leaves it on evaporation accompanied by a little vanillin, and other impurities. The vanillin is secured by crystallization, and the residual impurities by resolution in ether, concentrating to crystallization, and final recrystallization from alcohol or acetic ether.—Arch. d. Pharm., *138* (Sep. 26 and Nov. 10, 1900), 555–568.

TERNSTROMIACEÆ.

Tea—Method of Determining Water-Soluble Constituents.—Ad. Beythim, T. Borisch and Jos. Deiter recommend the following expeditious method of determining the quantity of water-soluble constituents in a large number of samples of tea: Three Gm. of the finely powdered tea are placed on a circular linen-cloth of 20 Cm. diameter, the cloth is folded and tied securely, weighted with a numbered tag of lead, and suspended along with 8, 10 or more similarly prepared samples in an enameled vessel filled with water which is kept boiling for two hours. The bags are then immersed in a fresh portion of water and again boiled for the same

length of time, and this process is repeated until the water after two hours' boiling remains perfectly colorless. The linen bags are then opened, spread out in a porcelain capsule, and dried in the air, whereupon the exhausted tea-powder may easily be transferred quantitatively to weighing-glasses, in which it is dried to constant weight. From the weight of extract ascertained by difference, the previously determined percentage of water-content is deducted, and the actual percentage of water-soluble contents of the tea is thus conveniently and expeditiously determined when a number of examinations are to be made.—Apoth. Ztg., July 18, 1900, 488; from Ztschr. f. Unters. d. Nahr. u. Genussm., 1900, 145.

Teas—Percentage of Theine in Different Sorts.—J. Kochs communicates the results of analyses of various kinds of Chinese teas, all of them pure, with an exquisite aroma, due to the packages being hermetically sealed. The yield of theine is remarkably high; the percentages found are Souchong, 2.83; Flower Pekoe, 4.36; Scented Tea, 3.08; Pouchong, 3.44; Congou, 3.83; Oolong, 3.66. A Brazilian tea, Chà Morumby, contained 3.11 per cent. of theine. The author states that though an assay may detect adulterations, yet it is not a complete guide to the quality of a sample of tea, in so far as its suitability for use and its market value. Just as with coffee, the appearance, aroma and taste of both leaf and infusion are points which guide the tea expert and the dealer. A further comparative examination of different samples shows that tea from Assam, Ceylon and Java is better packed and consequently has more aroma than that from China and Japan. Tea is artificially flavored in China only. According to the late Mr. W. Krohn, formerly consul at Futschau, only the scented Orange Pekoe undergoes this treatment. The author has analyzed a sample from Shanghai, and recognizes that the tea is of excellent quality, and that the flavoring is in no wise an attempt to adulterate the article.—Pharm. Journ., Nov. 17, 1900, 537; from Revue Cult. Colon., 7, 494.

ERYTHROXYLACEÆ.

Coca Leaves—Botanical Origin of the Commercial Sorts.—Prof. H. H. Rusby communicates the results of an elaborate and comprehensive study concerning the botanical origin of coca leaves, which he believes establish the following facts: (1) That the Bolivian, Huanuco, Brazilian, most Venezuelan, Argentinian, and other leaves of that type, used commercially for the extraction of crystallizable cocaine, are specifically identical. (2) That these leaves pertain to the species *Erythroxylon Coca*, Lamarck. (3) That the leaves known in the New York market as "Truxillo leaves," and also known as "Java leaves," called *Erythroxylon Coca Spruceanum*, by Burck, pertain to a different species from the above, and that, if this is not *Erythroxylon Hondense*, H. B. K., it must be known as *Erythroxylon Truxillense*, the name *Erythroxylon Spruceanum* being preoccupied.

(4) That the leaf frequently spoken of in British journals as the "Truxillo leaf," and largely cultivated in British provinces, from plants derived from one mother-plant cultivated at Kew, and called by Morris *Erythroxylon Coca nova granatense* is especially distinct from both, and is the *Erythroxylon carthagenense*, Jacquin. The author's paper is profusely embellished with cuts, clearly supplementing the text, and pointing out the different species of *Erythroxylon* discussed. — Drugg. Circ., Nov., 1900, 220–223.

Dr. E. M. Holmes, in a likewise comprehensive paper, also illustrated with a number of cuts, reviews Prof. Rusby's paper and criticises some of his conclusions. Referring to his first proposition, he finds that Prof. Rusby's contention that the Bolivian, Kuannen, Brazilian and Venezualan leaves, etc., are derived from *Erythroxylos coca*, Lamarck, is substantially correct, and that therefore the plant producing the Bolivian leaves cannot be called *Erythroxylos bolivianum*, Burck. Regarding the "Truxillo leaves," Dr. Holmes, after going over the ground very thoroughly, says that Prof. Rusby has undoubtedly done well to adopt the name *E. truxillense* for the *E. spruceanum* of Burck, and that if he will add to his description the relative length of the styles, and the character of the stamens as regards their relative length, a service will have been done to both botanical and pharmaceutical science in giving greater precision to the character of plants intended to be official in the various pharmacopœias, and to the limits of variation of the species of the plants that yield commercial coca. With respect to *Erythroxylon nova-granatense*, Morris, Dr. Rusby's statement that the leaves are commonly met with in Great Britain under the name of "Truxillo coca," lacks confirmation. Dr. Rusby's suggestion of the identity of the *E. nova-granatense*, of Morris, with the *E. carthagenense*, of Jacquin, appears to be well founded, but the identification is not complete, and Dr. Holmes, therefore, considers that it will be better to retain Morris' name until more precise identification of the plant with Jacquin's *E. carthagenense* is possible.—Pharm. Journ., Jan. 5 and 26, 1901, 3–4 and 81–82.

Coca—Satisfactory Method of Assay.—Wm. R. Lamar expresses the opinion that a lack of appreciation of the extreme instability of the alkaloids of coca is, in the main, the cause of the many discordant results in the assays published. Having frequent occasion to determine the alkaloidal content of this drug, he communicates the one in use in the laboratory of W. H. Schieffelin & Co., of New York, which he has found to give perfectly satisfactory results. The process is a modification of the well-known one of the late Dr. E. R. Squibb (see Proceedings, 1888, 306), in which a dilute solution of ammonium hydrate is substituted for the solution of sodium carbonate employed to liberate the alkaloids from their natural combinations. The materials and quantities used are as follows: Coca, in No. 40 powder, 25 Gm.; ammonium hydrate (2 per cent. NH_3),

25 Cc.; $\frac{N}{10}$ hydrochloric acid, 75 Cc.; ether, kerosene oil, of each a sufficient quantity. The details being necessarily omitted, it may be here mentioned that the coca is macerated with the ammonia solution for half an hour, observing that at the end of that time the ammonia is perceptible after stirring; 75 Cc. of kerosene oil is then stirred into the mixture, and, after an hour or more, the whole is transferred to a tall percolator and percolated with kerosene oil, at the rate of six or eight drops per minute, until about 450 Cc. of percolate are obtained—though less may serve under circumstances. The percolate is then shaken out with three consecutive portions, each of 25 Cc. $\frac{N}{10}$ hydrochloric acid. The acid solution of the alkaloids is then shaken out with two portions, of 20 and 15 Cc. respectively, of ether to remove traces of kerosene oil, the ether being washed with two portions, of 5 Cc. each, of water, this water being added to the acid solution. The acid solution being now transferred to a third separator, it is rendered *slightly* alkaline by the addition of 10 per cent. ammonia water previously diluted with four times its volume of water. If of the proper strength, then 6.64 Cc. of the dilution will be sufficient—in practice 8 to 9 Cc. are usually required. The alkaline liquid is now shaken out three times successively with ether in portions of 40, 30 and 20 Cc. respectively, under specific precautions given so as to prevent loss, the united ethereal solutions are then evaporated and dried to constant weight. The author reports parallel experiments made by this modified process of Squibb's and by the so-called Keller method, and gives figures which appear to indicate its superiority over the latter. The alkaloids obtained by the modified method are almost colorless and beautifully crystalline in appearance, while those obtained by Keller's method are very dark brown, crystallize from ether with difficulty, and, though larger in quantity gravimetrically, come out much lower when estimated by titration.—Amer. Journ. Pharm., March, 1901, 125–131.

MELIACEÆ.

Mkomavi Kernels—Constituents.—H. Thoms has subjected the fresh kernels of the fruit of the mkomavi tree, from German East Africa, to proximate examination. They have a strong bitter taste and contain, besides 45.2 p. c. of water, 0.327 p. c. of fat, and 1.11 p. c. of ash, a very bitter principle, which the author has named

Mkomavin. It was obtained as an amorphous body, which is easily pulverized, forming a white powder. It melts at 110°–111°, becomes blood-red on addition of conc. sulphuric acid, and yields on boiling with alcoholic hydrochloric acid and dilution with water a very bitter product having a melting point of 97°–98°, but no glucose. It contains no nitrogen. Failure to obtain mkomavin in a crystalline condition prevented the author from undertaking its elementary analysis.—Apoth. Ztg., Sept. 19, 1900, 653; from Tropenpflanzer, 1900, 436.

SAPINDACEÆ.

Æsculus Hippocastanum—Proximate Constituents of the Seeds.—In view of the fact that horsechestnuts have recently been employed in the preparation of food products, E. Laves has subjected these seeds to proximate analysis. He finds the fresh decorticated seeds to contain 36 9 per cent. of water. The dry powder yielded 29.08 per cent. of extract to alcohol, being a white, tasteless powder which had the following percentage composition: Albumen, 10.63; dextrin, 1.7; starch, 64.8; ash, 3.16 per cent.; phosphorus, 0.32 (= P_2O_4: 0.751); sulphur, 0.138 (SO_3: 0.344). The ash has an alkaline reaction, and contains: Calcium oxide, 0.14; magnesium oxide, 0.26; ferric oxide, 0.001. With the average starch content of cereals, it is much richer in phosphoric acid and salts than the ordinary grains. The seeds contain saponin, and possibly other glucosides.—Pharm. Ztg., June 12, 1901, 471; from Pharm. Centralh., 1901, No. 22.

A. Flugge renders horsechestnuts palatable as a food by depriving them of the bitter principle by the following simple process: The seeds are superficially roasted, so as to remove the shells, then powdered, and extracted by percolation with alcohol or ether-alcohol, after macerating for about a week, until the bitter principle, resins, etc., are completely removed. The residual powder, after drying, constitutes a wholesome, pleasant and cheap food, containing all the nutrient qualities of the seeds. Pharm. Ztg., Feb. 12, 1901, 132.

POLYGALACEÆ.

Polygala Senega and Polygala Alba—Characters of Distinction.—L. E. Sayre considers it unquestionable that the market supply of senega root, in the United States, is mostly derived from *Polygala senega*, L., or a variety of this plant, *Latifolia*. While there is little reliable information concerning the collection of this root in the south, there is direct information concerning its growth and collection in the north. From the author's review of the information gathered, as well as his own experience, it appears that in many respects the northern root resembles the southern, but that the cicatrix-like elevation—usually called the "keel"—found upon one side and twisting with the root, is not quite so common in the northern root as in the southern. Experience, since 1892, leads him to the belief that the proportion of keelless root to the keeled is by no means constant; nevertheless, the author suggests that the pharmacopœial description of the drug be revised and that this should make it appear that about two-thirds of the root is keeled by the irregular development of the xylem and phloem. The author, furthermore, calls attention to the possible admixture of "Kansas senega" with the northern roots, the Kansas polygala having been identified by the late Prof. Maisch as being the root of *Polygala alba*—both this species and *P. senega* being found in Kansas. In the present

paper a pharmacognostic and histological description of the true and false senega, carried out by Charles Sterling, is given, accompanied by cuts showing the roots and their histological characteristics, of *P. senega* and *P. alba*.—Drug. Circ., Febr., 1901, 26.

Spurious Rhatany Root—Occurrence and Description.—Prof. H. Marsden describes a specimen of so-called rhatany root, obtained from Peru, and offered in the Liverpool market, which differs both in its macroscopic and microscopic characters from the official rhatany, as well as from the root of any species of *Krameria* with which the author is acquainted. The root, (typical specimens, as well as of delayed leaves, are shown in exact size, together with an enlarged transverse section,) occurs in pieces of varying shape, usually tapering, sometimes contorted. There are remains of stems and radical leaves on the upper part. The roots vary in size from five to nine centimeters in length, by half to one and one-half centimeters in diameter. The bark is reddish-brown in color, scaly, and longitudinally grooved, and has transverse ridges. The fracture is short, and exhibits a meditullium of some twenty-four wedge-shaped bundles, with a well-marked pericambium. The root has no definite odor, but an astringent taste. Examined microscopically, a transverse section exhibits an outer suberous layer of flattened cells; below which are cells, similar in shape, containing red coloring matter; below these again occurs loose parenchymatous tissue of thin-walled polygonal cells, rather wider than deep. The medullary rays are strongly marked, and are from one to four or five cells in width, separating at the fibro-vascular bundles. The latter are cuneiform in shape, and possess large wood vessels which on longitudinal section are seen to be thickened in a scalariform manner. There are crystals in the root, which occur more particularly in the cells forming the medullary rays. In the true rhatany roots the most salient features or the finer structure are found to be the entire absence of crystals. Some years ago, however, Dr. Holmes described a new variety of rhatany, under the name of *Guayaquil Rhatany*, but believed by him not to be a *Krameria*. This was subsequently examined microscopically by T. Feuilloux, who found this root to contain stellate crystals of oxalate of calcium. There is reason to believe that the spurious rhatany under consideration is nearly allied to that examined by Feuilloux.—Pharm. Journ., May 18, 1901, 618.

FUMARIACEÆ.

Corydalis Cava—Alkaloidal Constituents.—J. Dobbie, A. Lauder, and P. G. Talialseas have subjected the alkaloids of *Corydalis cava* to chemical investigations, and as a result point out that

Corydaline and *Corybulbine* differ from each other by CH_2, and in that corydaline—$C_{18}H_{15}N(OCH_3)_4$—contains four methyl groups, whilst corybulbine—$C_{18}H_{16}NO(OCH_3)_3$—contains only three. They have also proved

that corybulbine contains a hydroxyl group and forms a mon-acetyl derivative, $C_{18}H_{15}N(OCH_3)_3O.C_2H_3O$. By treatment with concentrated hydrogen iodide the two alkaloids yield the same phenolic derivative, $C_{18}H_{15}N(OH)_4.HI$. Corybulbine can be readily converted into corydaline by treatment with equivalent quantities of methyl iodide and potassium hydroxide in methyl alcohol solution. The artificial corydaline agrees with the natural alkaloid in melting point, solubility in various reagents, and specific rotation. The platinichloride, ethyl sulphate and hydriodide of the natural and artificial substances have been compared and found to be identical.—Pharm. Journ., Dec. 22, 1900, 723; from Proc. Chem. Soc., *16*, 205.

PAPAVERACEÆ.

Opium, B. P.—Necessity to Raise the Standard.—Edwin Dowzard calls attention to the ridiculously low standard given by the B. P.—as has already been done years ago by the late M. Conroy—to opium. The requirement is not less than 9.5 and not more than 10.5 per cent. of anhydrous morphine in opium after drying and powdering. He shows the result of 25 determinations of morphine in opium dried and powdered before standardization, the lowest percentage obtained being 12.3 and the highest 14.9 per cent. The Pharmacopœia, if it is desirable to include a minimum and maximum morphine content, should therefore raise the standard at least 2 per cent.—Trans. Brit. Pharm. Conf., 1900, 513.

Sanguinaria—Assay of the Crude Drug and Its Preparations.—Paul Murrill and J. O. Schlotterbeck apply Gordin and Prescott's method for the assay of alkaloids (see Proceedings, 1901, 122) to the assay of sanguinaria and its preparations, and find it to excel in simplicity of manipulation and accuracy of the results obtained. For the assay of the crude drug, 5 Gm. of the powder are moistened with ammonia, dried, and exhausted with chloroform in a Soxhlet apparatus. The residue of evaporation is then treated exactly as in the case of fluid and solid extracts. For the assay of fluid extracts, 10 Cc. are run into water acidulated with acetic acid, made up with water to 250 Cc., and the solution filtered. Of this filtrate, 100 Cc. (=4 Cc. fl. extr.) are shaken out successively with 15, 10, 10 and 5 Cc. of chloroform, and the solutions are evaporated either spontaneously or with the aid of gentle heat. The residual alkaloid contains a little purple coloring matter, which, however, does not interfere with the assay. It is dissolved in 1 or 2 Cc. of chloroform, then 20 or 30 Cc. of $\frac{N}{50}$ sulphuric acid is added, the mixture warmed to expel all the chloroform, and the solution of the alkaloid washed into a measuring flask and cooled. Mayer's reagent is added to complete precipitation, the whole is brought to a definite volume (50 or 100 Cc.) with water, filtered, and the excess of acid titrated with $\frac{N}{50}$ KOH, using phenolphthalein as indicator. From the quantity of acid consumed by the alka-

loid, the percentage of alkaloid is calculated on the basis of 0.006943 Gm. chelerythrine for each Cc. of $\frac{N}{50}$ acid. In the case of solid extract, if alcoholic, it is dissolved in ten parts of 70 per cent. alcohol, and 10 Cc. of this treated in the same way as so much fluid extract; it an aqueous extract, it is dissolved in acidulated water, made alkaline with ammonia, shaken out with chloroform, and further as in the case of fluid extract.—Merck's Rep., Oct., 1900, 451.

CRUCIFERÆ.

Erysimum Aureum—Toxic Glucosidal Constituent.—Schlagdenhauffen and Reeb have isolated from the seeds of *Erysimum aureum* a new glucoside, which they have named

Erysimin. They describe it as a pale yellow, amorphous substance, slightly hygroscopic, melting at 190° C., and having the composition $C_4H_7O_2$. It is soluble in all proportions in water and in alcohol, but insoluble in ether, chloroform, benzol, and in carbon disulphide. It is stated to be a powerful heart poison. The seeds do not contain myronate of potassium.—Pharm. Centralh., Feb. 7, 1901, 94; from Chem. Ztg., 1900, 1022.

Mustard Seed—Assay of the Seed, the Oil and the Paper.—Dr. Carl Dieterich, after a brief review of the literature, recommends a method for the assay of mustard seed, mustard paper, and mustard oil, which embraces: (1) The estimation of the volatile oil; (2) the estimation of the fixed oil; (3) the estimation of the residue; (4) the estimation of ash in the original seed; and (5) the estimation of ash in the residue of extraction. The process of estimating the *volatile oil* is briefly as follows: Five Gm. of the seed under examination are crushed in a mortar, transferred to a 200 Cc. flask with the aid of 100 Cc. of water, and the flask, well closed, is then set aside at a temperature of 20°–25° for 2 hours. Then 10 Gm. of alcohol are added, the flask is connected with a Liebig's condenser, this, in turn, with a receiving flask of 200 Cc. capacity, containing 30 Cc. of ammonia solution, into which the condensing tube dips. The receiving flask, again, is connected in the same way with a second receiving flask, containing ammonia, to avoid all loss. Heat being applied to the distilling flask, from 50 to 60 Cc. of liquid is collected in the first receiving flask. The apparatus is disconnected, the condenser is rinsed with a little water, the rinsings are added to the distillate, to which silver nitrate is now added in excess—stirring and treating the mixture on the water-bath so as to promote the separation of the precipitated silver sulphide. This is collected on a filter, which has previously been washed successively with ammonia, hot water, alcohol and ether. After washing the precipitate with hot water, the water is displaced by washing with alcohol, this in turn with ether, and then is easily and rapidly dried at 80° C., to constant weight. The weight of Ag_2S so ascertained, multiplied by 0.4311,

gives the weight of volatile oil of mustard in the sample. This process is applied in the same way to mustard paper and to the volatile oil itself, under such modifications as will readily suggest themselves. The author gives the results of the examination of 17 different samples of mustard, and compares them with the results obtained by Gadamer's, Grützner's, and E. Dieterich's methods. The results by his method—a modification of that of E. Dieterich—are concordant among each other and give relatively higher numbers than do the other methods mentioned. The *fixed oil* is determined by extraction with petroleum ether in the Soxhlet apparatus. The *residue* is the portion remaining after extraction with petroleum ether, dried to constant weight. The *ash* determinations are made in the usual manner. All determinations refer to the air-dry seed.—Pharm. Ztg., Oct. 3, 1900, 767–769.

BIXINEACEÆ.

Commercial Chaulmoogra Seeds—Botanical Source.—Dr. E. M. Holmes observes that allusion has already been made to the fact that chaulmoogra seed is not yielded by *Gynocardia odora*, and it has been suggested that these seeds, as well as the commercial oil, be referred to a new species to be called *Gynocardia prainii*, in honor of Dr. D. Prain, the Director of the Calcutta Botanical Garden. The latter has recently sent some seeds for the Museum of the Pharmaceutical Society—which are shown in an illustration accompanying Mr. Holmes' note—and expressed the opinion that chaulmoogra seeds of commerce do not belong to the genus *Gynocardia*, but probably to the genus *Hydnocarpus*.—Pharm. Journ., May 11, 1901, 596.

Oleum Gynocardiæ—Therapeutic Uses.—According to "E. Merck's Annual Report" for 1900, oleum gynocardiæ continues to be used in cases of leprosy, and has been administered in the form of soap, made into keratinized pills. The soap is prepared by heating in a steam bath 1000.0 Gm. of the oil, together with a solution of 175.0 Gm. of caustic soda in 750.0 Gm. of water, until a product is obtained which is soluble in alcohol; the soap is then diluted with 2500.0 Gm. of water and heated upon an open fire to near boiling point, after which 1200.0 Gm. of sodium chloride solution (1 : 3) is added and the whole raised to boiling point. After cooling, the resulting soap cake is washed with water and afterwards compressed, so as to remove adhering moisture. The pills are prepared by dissolving 3 parts of the soap in 2 parts of distilled water, and adding to the solution 2 parts of a tallow-like mass consisting of 500.0 Gm. of beef suet, 100.0 Gm. of beeswax, and 5.0 Gm. of 10 per cent. solution of coumarin; finally add 1 part of kaolin. Each pill should weigh 0.45 Gm., corresponding to 0.15 Gm. of the oil. Ten pills may be taken daily.—Pharm. Journ., June 15, 1901, 755.

DROSERACEÆ.

Pitcher Plants—Confirmation of a Zymase in the Glands of the Pitchers.—In the course of an exhaustive research on the process of digestion of *Nepenthes*, G. Clautrian confirms the observation of previous workers that the glands of the pitchers secrete a zymase, which, in acid solution, is capable of digesting albuminoids. As in the case of *Drosera*, the presence of a foreign body is necessary to excite the full excretion of the ferment and its accompanying acid. The amber-colored fluid in the pitchers after the process of digestion contains an undetermined coloring matter which is reddened by alkali. This coloring matter is not a product of digestion, but is derived from the tannin of the glands. — Pharm. Journ., Mar. 2, 1901, 261 ; from Chem. Centralbl., *72*, 57.

Venus Fly Trap—Two Distinct Varieties in North Carolina.—William Niestlie calls attention to the occurrence of two distinct varieties of the Venus Fly Trap — *Dionæa Mucipula* — in New Hanover county, N. C. The one is the ordinary variety, while the second variety is distinguished by the beautiful red color of the under side of the leaf, and has not heretofore been described.—Proc. N. C. Phar. Assoc., 1900, 21.

CUCURBITACEÆ.

Colocynth—Percentage of Ash and Microscopic Elements of the Powder.—Henry G. Greenish has determined the ash in the pulp and seed of seven different specimens of colocynth fruit, with results from which the following table has been constructed, the percentages for the entire fruit being approximately calculated from those of the pulp and seeds on the basis of 25 per cent. of pulp to 75 per cent. of seeds, a relation found in practice to be a sufficiently correct average :

No.	Sample.	Ash in Pulp (Per cent.)	Ash in Seed (Per cent.)	Ash in Fruit (Approximate Per cent.)
1	Spanish	11.57	(a) Ripe 2.56 (b) Unripe 5.37	5.86
2	Spanish	9.65	(a) Ripe 2.26 (b) Unripe 4.56	4.97
3	Turkey	10.27	2.79	4.66
4	Spanish	11.31	2.16	4.43
5	Turkey, 2d quality	8.62	2.19	4.55
6	Turkey, fine	9.92	2.74	4.53
7	Turkey, fine	13.43	2.45	4.94

Five samples of commercial powder were also examined, three being powdered pulp, and yielding respectively 8.75, 11.48 and 11.30 per cent. of ash ; the other two were the powdered entire fruit, and yielded 5.04 and 7.03 per cent. of ash respectively. The percentage of ash in the

entire fruit being considerably lower than in the pulp alone, both in the case of the commercial samples of powder and in the approximate calculations, it might be inferred that ash determinations would sufficiently distinguish between the two; but, by accident or intention, inorganic matter might be introduced into the powder of the entire fruit, 5 per cent. of such bringing the percentage of ash in this as high as that in the pure pulp. The author considers the elements of which the pulp consists so simple that they are easily susceptible of description so as to exclude seeds, starch, and most other foreign bodies, and therefore considers the following as being sufficient for pharmacopœial description in place of that now given in the B. P.: "The powdered drug consists of the débris of large, thin-walled, parenchymatous cells, with occasional small vascular bundles. It should be free from starch, and should not contain more than an occasional sclerenchymatous cell, or group of such cells."—Pharm. Journ., Mar. 30, 1901, 398–399.

PASSIFLORACEÆ.

Papaw, Distribution, Cultivation, Uses, etc. — In an admirable paper entitled "The Story of the Papaw," F. B. Kilmer gives a comprehensive account of the natural distribution, cultivation, and the various economic and medicinal uses of the "papaw" (*Carica Papaya*), the first part of which is published in the "Amer. Journ. Pharm.," June, 1900 (272–285). The author handles his subject so comprehensively, that it must be considered a valuable monograph, which not only lucidly explains what has already been observed concerning this interesting plant and allied species, but gives much valuable information gathered by the author during his sojourn in tropical America. It would serve no good purpose to make random abstracts from the present installment of this paper, which may be best consulted in the original. From advance notices it is evident that the next following installment will embody original observations, which may be profitably abstracted for next year's report.

ONAGRACEÆ.

Water Nuts—Chemical Constituents of the Kernel.—A. Lega and D. Knez-Milojkovic have subjected the kernel of the fruit of *Trapa natans*, L., to chemical examination. It is known as the water nut, and consists of a hard woody shell which has four horn-like prickles, then a thin light-brown skin covering a white kernel. The kernel and the skin are eatable. The authors give the following results of their analysis: water, 37–39; nitrogenous matter, 8–10; fat, 0.7–0.8; carbohydrates, 49; fibre, 1.2–1.4; ash, 1.2–1.4; and phosphoric anhydride, 0.56 per cent. The starch disintegrates at 76° C., and the swelling of the starch grains begins at 62–64° C.—Pharm. Journ., April 20, 1901, 485; from Chem. Centralblatt, *72*, 410.

COMBRETACEÆ.

Terminalia Oliveri—Source of a Possibly Valuable Tanning Product.—D. Hooker states that the astringent extract obtained from the bark of *Terminalia oliveri*, known as "Thansha," as ordinarily prepared, has a poor reputation as a tanning material, would become a valuable economic product when properly prepared. He finds that the bark of the tree contains 39.7 per cent. of tannin and coloring matter, the leaves also yielding 22.7 per cent. of the same constituents; the alcoholic extract of the bark gave 25.4 per cent. of tannin and an aqueous decoction of the leaves 14.5 per cent. Dunstan found 68.27 per cent. of tanning material in a specimen of "Thansha" examined in the laboratory of the Imperial Institute, and Procter states that in reactions it agrees with cutch, and finds that the bark contains 31.1 per cent. of tanning matter. Hummel found that the extract gives poor results as a dye for calico printing. "Thansha," as received at the Economic Laboratory of the Indian Museum, was a somewhat soft extract, of a deep red color and astringent taste. It was almost entirely soluble in water, and 75 per cent. is dissolved by rectified spirit. The solutions were acid in reaction. This specimen contained over 50 per cent. of tannin. When pure and properly prepared the products of the "Than" tree should therefore rank with the widely-known myrobolans, produced by the nearly allied *T. chebula*. The absence of red and brown coloring matter in "Thansha" is of great advantage for the tanning of higher grade leather.—Pharm. Journ., May 18, 1901, 617; Agricultural Ledger, 1900, No. 8.

ROSACEÆ.

Quillaia Bark—Saccharose a Constituent.—It has been pointed out from time to time that quillaia bark contained, besides the glucoside saponin, a carbohydrate, and this was considered by A. Meyer to be lactosin, which he had isolated from caryophyllaceous plants. G. Melhèrs has now identified this carbohydrate to be saccharose, but finds no trace of lactosin in quillaia.—Pharm. Jour., Feb. 16, 1901, 161; from Bull. Soc. Chim., *25*, 141.

LEGUMINOSÆ.

Leguminous Plants—Use of Several Kinds by the Natives of the Ivory Coast.—From information supplied by Dr. Mondon, Dr. E. Heckel reports on the use of several leguminous plants by natives of the Ivory Coast in Western Africa: The plant *Cassia alata*, L., is used on the Ivory Coast for the same purpose, viz., skin disease, as is the case in extreme eastern countries, among Hindoos, Annamites, and inhabitants of Tonkin. The fresh leaves are bruised and applied direct to cutaneous affections characterized by eruptions or even pustules. *Cassia occidentalis*, L., is important as a purgative and diuretic in the treatment of fevers accompanied by

jaundice, being administered in the form of an infusion of the leaves. The stem is a violent purgative. Europeans find a draught of the infusion of the leaves in the early morning an excellent preventive of sick headache: it is useful also in cases of yellow fever. Another well-known remedy, *Abrus precatorius*, L., is prescribed by native doctors in the form of an infusion of the leaves in the treatment of colic, and the chopped-up leaves are used locally as a remedy in certain eye diseases. It would be well if a chemical examination were made of the leaves, in order to determine whether the alkaloid abrine exists in them as well as in the seeds.—Pharm. Journ., Oct. 20, 1900, 439; from Revue Cult. Colon., 7, 548.

Astragulus Caryocarpus—Proximate Constituents.—G. P. Frankforter contributes a preliminary paper on the proximate constituents of the fruit and entire plant of *Astragulus caryocarpus*, the fruit having the reputation of being poisonous in certain stages of its growth, and resembling in some respects the poisonous substance which is supposed to exist in the common "loco plant," *Astragulus mollissimus*, and several other species of the same family. He finds that the peculiar sweet taste of the ripe fruit is due to a peculiar sugar,

Astragulose, which is optically active, reduces Fehling's Solution, and forms a beautiful hydrazone. When purified and dried this sugar had a specific rotation $(a)_D = -38.5$, and a melting point between 95° and 98° C. Analytical data correspond best for the ordinary disaccharide. With phenylhydrazine it produces a well defined, amorphous hydrazone which melts, when purified, at 186°–198° C. While analysis indicates a hydrazone of a hexose, no conclusion can be drawn from the ascertained facts as to the size of the molecule. Astragulose is possibly a complex sugar, since it loses its optical activity on keeping, and at the same time its reducing power is increased. In becoming inactive, the sugar undoubtedly breaks down, resulting either in a simpler inactive sugar, together with certain inactive by-products, or in two sugars with equal dextro and laevo properties. An

Alkaloidal Constituent, occurring in crystals, was also detected in the juice, and this is probably likewise present in the entire plant. Further experiments must determine this and other constituents definitely.—Amer. Journ. Pharm., July, 1900, 320-325.

Balsam of Peru—Method of Collection. — Preuss describes the extraction of balsam of Peru as practiced in Salvador, where the balsam tree grows wild, sometimes isolated, and sometimes in groups. There do not appear to be any special plantations of it, but its arrangement in rows suggests that some trees at least were planted. The tree is 20–25 meters high, rarely reaching 30 meters. The balsam owes its typical qualities neither to the wood, nor the bark, as such, but to the treatment to which the tree is subjected. It undergoes a process of wounding and

bruising with an axe or stone; pieces of bark are shredded down, laying open the wounded patch, when, after a few days, the balsam trickles out, and is caught. After this, the wounded place is heated with torches, balsam exudes, and deep notches are made. Finally it is re-heated, and the remainder of the balsam is obtained. Then the worker scratches off the inner bark down to the wood, breaks it up to powder and boils it out with water, which, after separation and pressing gives the "bark balsam," which is more concentrated than the first obtained, and has a stronger odor. The balsam of Peru of trade is a mixture of the two of definite proportions; 100 trees yield yearly 300–500 lbs. of balsam. It is not likely that the balsam is locally adulterated by the merchants, since it is so cheap.—Schweiz. Wochenschr., Jan. 26, 1901, 38.

Balsam of Peru—Active Constituents.—Dr. Ernest Erdmann read an interesting paper on balsam of Peru at the meeting of the German Naturalists and Physicians (Sept., 1900), in which he points out that the chief active constituent of the balsam is

Benzoic Acid-Benzyl Ester, and that this can readily be prepared synthetically. The volatile oil of balsam of Peru, known as *Cinnameïn*, is not as stated by Hager, and by Schmidt, cinnamic acid-benzyl ester, but is composed largely of the benzoic acid-benzyl ester and a comparatively small percentage of cinnamic acid-benzyl ester. A sample of balsam of Peru from San Salvador was found to contain 60.9 per cent. of the volatile oil, 15.3 per cent. of resin, and 23.1 per cent. of free acids—chiefly cinnamic and benzoic. The resin is soluble in caustic alkali, but precipitable from such solutions by carbonic acid. The two esters are readily separated from each other by fractional distillation in a vacuum, and may then be obtained in a pure condition. When perfectly pure, they possess all the characters and properties of the synthetic esters, with which they are identical both in their chemical and therapeutic characters. The benzoic acid-benzyl ester is a colorless oily fluid, boiling at 173° and congealing below 32°, whilst the cinnamic acid compound boils at 213–214° (under the same pressure = 9 Mm.) and readily congeals at 37° C. A 25 per cent. solution of the synthetic benzoic acid-benzyl ester in castor oil is recommended for medicinal use. The pure ester is marketed under the name of

Peruscapin, while its solution in castor oil has been introduced into medicine under the name of

Peruol. The pure synthetic ester, and its solution in castor oil, has been subjected to clinical experiments during the past year and a half, and has been found to be a prompt and efficient remedy in the treatment of scabies, not alone replacing balsam of Peru completely for this purpose, but possessing the advantage of freedom from odor and freedom from acids, and, consequently, from irritant components.—Pharm. Ztg., Sept. 22, 1900, 734.

Balsam of Peru—Requirements of the Phar. Germ., IV.—Caesar and Loretz (Gesch. Ber., 1900) remark that adoption of a saponification number, of a fixed cinnameïn content and an ester number for the latter by the Phar. Germ., IV., is a rational improvement on the older methods for determining the quality of balsam of Peru. They regret, however, that the nitric acid test has been dropped, since this simple and quick test has always given a fair indication of the quality of the drug. In ten large lots of the balsam, imported from San Salvador, the sp. gr. varied from 1.141 to 1.153, the cinnameïn from 55.66–66.07 per cent., and the ester number of the cinnameïn ranged from 220 to 236.—Pharm. Rev., Nov., 1900, 522.

Balsam of Peru—Ambiguity of the B. P. Description of Dietrich's Test.—John Humphrey calls attention to the ambiguous wording of the B. P. modification of Dietrich's test of purity of Balsam of Peru. In the original it is directed that the balsam should be exhausted with ether, and the ethereal solution, after filtration, shaken with sodium hydroxide solution to remove the resin; the ethereal solution must then be separated, and leaves on evaporation a residue of cinnameïn and other aromatic bodies. In the official monograph, however, we are directed to shake the balsam with sodium hydroxide solution first, then wash with ether and, the ether having been removed, weigh the residue (?) after cautious drying. The residue to be weighed is, of course, that left on evaporating the ethereal solution, though that is not stated. The wording of the test makes it appear that the residual balsam is referred to.—Pharm. Journ., Jan. 12, 1901, 29.

Cassia Fistula—Preparation and Characters of Volatile Oil from the Fruit.—Haensel has obtained from the powdered fruit of *Cassia fistula*, on distillation with steam, a volatile oil, while the aqueous distillate contains normal butyric acid. The volatile oil has a honey-like odor, and forms at ordinary temperatures a dark yellow amorphous mass, which melts at 41° C., and has a faint acid reaction.—Pharm. Centralh., Dec. 13, 1900, 773; from Haensel's Ann. Rep. for the 3d quarter, 1900.

Cassia Montana—A Spurious Senna.—Dr. E. M. Holmes states that during the past few months two large consignments of senna leaves from Madras have appeared on the London market, which, while resembling in size ordinary Tinnevelly senna, differ in the browner tint and in the rounded edges of the leaves. The leaflets are on the average about 3–3½ Cm. long and 8–10 Mm. broad, are slightly unequal at the base, furnished with a petiole about 2 Mm. long, and a mucro of about 1 Mm. long at the rounded apex. This mucro is readily deciduous and is therefore found only on a few leaflets in the drug. The general tint is much browner on the upper surface, but paler and with a greener or slightly glaucous tint on the lower surface. The lateral veins are slender, darker colored, and more evident on the lower than on the upper surface, and

are placed at an obtuse angle. The midrib is prominent below, but the veinlets, although readily visible as a darker network than the rest of the leaf, are very slender and not visibly prominent. On the upper surface they are not easily seen. The odor and flavor are almost identical with that of senna, or, if anything stronger. The leaflets are quite glabrous, and some of them have a kind of glaucous bloom, as if the leaves secreted a wax on the surface. The rachis on which the leaflets are borne was present in the bales of leaves and also a very few of a longer flat brown pod about 10 Cm. long and 8–9 Mm. broad, and with faintly-raised ridges between the seeds, of which there are about sixteen. The rachis gave evidence in the form of scars of having borne 10–11 pairs of opposite leaflets. Dr. Holmes has identified these leaflets with those of *Cassia montana*, Hayne, by comparison with Wallich's specimen of the plant in the herbarium of the Linnean Society, and with a specimen in the herbarium at Kew. The distinctive feature of the spurious senna are the obtuse or rounded ends of the leaflets, the obtuse angles of the lateral veins, the presence of a well-marked dark network of veins on the under surface, and the presence of a distinct mucro, or the broken end of one, at the apex of the leaflets. The presence of the scars on the rachis also affords evidence, since there are only 6–8 pairs of leaflets on Tinnevelly senna leaves, but 10–15 on those of *Cassia montana*. Dr. Holmes' paper is illustrated with cuts showing the leaflets, the rachis of the leaf, and an immature pod. —Pharm. Journ., Mar. 25 1901, 646.

Cassia Montana—Histology.—Henry G. Greenish has determined and describes the histological characters of the leaflets of this spurious senna, with the particular purpose of enabling its detection in form of powder, which must be consulted in the original in Pharm. Journ., June 1, 1901, 694.

Copaiba—Variability and Question of Pharmacopœial (B. P) Definition. —John C. Umney and C. T. Bennett in an interesting paper review the important facts that have come to our knowledge respecting copaiba, which, notwithstanding that this drug has been in constant use almost a century, is not by any means perfect, and they undertake in their present investigation to answer a number of important questions concerning its acceptance and definition as an official medicament in the B. P. With regard to the therapeutic value of the volatile oil and resin, both relatively and individually for each, a review of the literature reveals opinions which can hardly be held as being concordant, but they indicate that both the volatile oil and the resin have their respective uses and advantages. Varying, as oleo-resins of copaiba do, in relative proportions of volatile oil and resin, the next question of importance is whether all commercial varieties of South American origin are of equal value, and whether they should all practically be included—as they are now—in the B. P.; and, if not, should characters and tests of a much narrower kind be framed, such

as will only include one or two well-defined varieties known to contain nearly constant relative proportions of volatile oil and resin; or, should even the resin itself be described, as well as the volatile oil, and both be made official in a revised B. P.? The authors point out that the South American varieties of copaiba — designated according to the port from which they are shipped, as Bahia, Cartagena, Maracaibo, Maranham, Para, and, unfrequently, Cayenne and Angostura copaiba — cover an enormous area from which they are derived, but that there seems little doubt that they are all obtained from species of *Copaifera*. Reviewing the requirements of the British, United States and German Pharmacopœias, they record the results of their examination of selected types of the five first-named varieties, and find that all the samples are practically up to the requirements of the B. P., 1898. Three of them—Cartagena, Maracaibo and Maranham — respond to the U. S. P. ammonia test, viz., clear solubility with one-third its volume of ammonia water, while Bahia and Para copaiba have also specific gravities below the U. S. P. standard, which is 0.940 to 0.990. Regarding the Germ. Pharm. requirement of acid, ester and saponification numbers, only one of the samples, Maranham copaiba, approaches these, and responds well with the higher limits of quality of the other standards. It has the sp. gr. 0.990, contains 41.8 per cent. of volatile oil, yields a brittle resin, forms a clear solution with ammonia, shows an acid number of 81.5, a saponification number of 94.3, and an ester number of 12.8. The answer to the main question is not easy to formulate. If it should be decided to retain the oleo-resin, the authors question whether, in view of the present incomplete state of our knowledge of the species of *Copaifera*, it would be possible to include only one variety, but they suggest a definition of characters and tests, which, permitting the use of the oleo-resin obtained from various species of *Copaifera*, seems calculated to secure as nearly as possible an oleo-resin corresponding in its characters to that of the Maranham copaiba examined by them. The authors, however, are evidently decidedly in favor of admitting the volatile oil and resin to official recognition. The

Volatile Oils of Copaiba distilled from the different commercial varieties all answer the requirements of the B. P., 1898, with the exception of the optical rotation, which, as given in that standard, is based on an incorrect abstraction of a paper by the present author, in whose opinion the following characters might be officially accepted: Specific gravity, 0.905 to 0.908; optical rotation in a tube of 100 Mm. — 7° to — 21°; range of boiling point, 245° C. to 275° C.; solubility in alcohol, 1 in 1. With regard to the

Resin of Copaiba, the authors are of the opinion that the determination of acid and saponification numbers, and the deduction from these figures of the ester number, is of little value, and they suggest that the following definition and characters be made official:

"The residue obtained from copaiba after the removal of the volatile oil. A hard, brittle, amorphous substance having a yellowish, yellowish-brown or reddish-brown color, and an acrid taste. Soluble in alcohol, ether and carbon disulphide, the solution having an acid reaction. 1 Gm. dissolved in 50 Cc. of absolute alcohol should require for neutralization at least 4.3 Cc. of semi-normal alcoholic potash, using phenol-phthalein as an indicator."—Pharm. Journ., March 16, 1901, 324–326.

Copaiba—B. P. Tests and Assay.—E. Wightman Bell has made a series of experiments with the object of ascertaining whether commercial samples of copaiba answer the requirements of the B. P., and whether the official tests should be altered or increased. Selecting ten samples of copaiba and one of gurjun balsam for his experiments, he finds that whilst copaiba is easily obtainable containing the amount of oil and answering the sp. gr. of the B. P., other samples, of good quality in other respects, do not answer these official requirements. The volatile oil obtained from four of the samples, considered of doubtful purity, had rotations varying from —16° to —34°, the rotation of that from three samples, considered pure, being —9°, —11° and —16° respectively, while the oil distilled from gurjun had a rotation of —3°. The residual resins from all the samples of copaiba examined were easily reduced to powder. All the samples were soluble or almost entirely so, in absolute alcohol and in petroleum spirit. All the oils of copaiba commenced to boil at 245°–250° C., and that from gurjun oil was found to boil at about the same temperature. Of the two color tests given in the B. P., that with nitro-sulphuric acid and carbon disulphide is undoubtedly the better, the acetic and nitric test being less sensitive and slower. Titration experiments show that there is a very close connection between the saponification number and the percentage of resin, and that the factor obtained by dividing the resin percentage by the saponification number is between 0.5 and 0.6 for the commercial samples of copaiba, while for gurjun balsam it is 1.8. The author suggests that a definite method for obtaining the percentage of oil be given, preferably that of evaporation at about 100° C.; that the rotation figures for the volatile oil be lowered; and that titration of the oleo-resin be introduced, and a "resin factor" added.—Trans. Brit. Pharm. Conf., 1900, 519–522.

Copaiba from British Guiana — Composition and Characters. — E. Wightman Bell has examined a specimen of copaiba from British Guiana. On comparing it with the official copaiba, he finds that with the exception of the optical rotation of the oil obtained from it by distillation, this copaiba assumes all the characters and tests of the B. P. In fact, in some respects it is shown to be of a higher grade of purity than many samples which meet the official requirement. It is pale yellow, somewhat less viscous than ordinary samples of copaiba, has a sp. gr. of 0.9797, and leaves a

hard and brittle resin on evaporation to dryness, amounting to 47.89 per cent. It is completely soluble in petroleum benzin, and leaves only a very small quantity of flocculent matter when dissolved in absolute alcohol. The volatile oil (52.11 per cent.) has the sp. gr. 0.9024, and a rotation of —9° in 100 mm. tube.—Trans. Brit. Pharm. Conf., 1900, 518.

Gum Tragacanth—Proximate Constituents.—C. O'Sullivan has made a comprehensive investigation of the proximate constituents, in the course of which he has isolated and studied the characters of the following:

Cellulose.—This constitutes the portion of the gum insoluble in boiling water and in cold dilute acids and alkalies. On treatment with boiling dilute sulphuric acid, it yields arabinose and a residue still retaining a cellulosic nature; but this, on treatment with ammonia and bromine, dissolves gradually, leaving no residue of normal cellulose.

Soluble Gum.—This yielded a series of gum acids of the nature of the "geddic acids." They are laevorotatory, however, the rotation being as much to the left as the geddic acids are to the right. They are shown to be

Polyarabinan-brigatactan-geddic acids, the chief of them being: $11C_{10}H_{16}O_8$, $3C_{12}H_{20}O_{10}$, $C_{28}H_{36}O_{20}H_2O$. The optical activity of this acid is —88°. On sulphuric acid hydrolysis it should yield 71.7 per cent. of "arabinose"; the actual yield from the mixed acids was 72 to 76 per cent. of moderately pure arabinose.

Starch.—Granules, apparently starch granules, were found. They are colored blue by iodine, and yield dextrose, but not maltose, on treatment with diastase.

Nitrogenous Matter.—This is much of the same nature as that obtained from geddic gum, but does not give the same proteid reaction.

Bassorin. This was not completely purified, but was found to be an acid which yields a barium salt, containing 9.2 per cent. BaO, and has an optical rotation of + 98°. It yields two isomeric acids, α- and β-tragacanthan-xylan-bassoric acid, when acted on by excess of alkali under conditions to be described hereafter.

α-Tragacanthan-xylan-bassoric Acid is soluble in cold water, has an optical rotation of + 138.2° to 138.6°, and a composition represented by the formula $C_{24}H_{34}O_{20},H_2O$. It yields sparingly soluble salts of Ba, Ca and Ag. Digested for twenty minutes at 98° with 5 per cent. sulphuric acid, it yields a laevorotatory pentose, *tragacanthose* ($C_5H_{10}O_5$) and

Xylan-bassoric Acid, $C_{19}H_{28}O_{17}$. This is almost insoluble in cold water; the alkaline salts are soluble, those of the alkaline earths and most heavy metals are insoluble. When this acid is further acted on by 5 per cent. sulphuric acid, it yields *xylan* ($C_5H_5O_5$) and

Bassoric Acid, $C_{14}H_{20}O_{15}$. Bassoric acid is almost insoluble in cold

water. In alkaline solution its optical activity was found to be + 255°. The barium salt yielded 28 to 29 per cent. of BaO—theory requiring 28.8 per cent.

β-Tragacanthan-xylan-bassoric Acid is left behind as a crumbly mass, when the α-acid is dissolved out by cold water. On combustion it yields the same numbers as the α-acid. In alkaline solution $[\alpha]_D = + 163°$–164°. The barium and calcium salts, as well as most of the salts of the heavy metals, are of very low solubility. Treated with sulphuric acid, it yields the same products as the α-acid.—Chem. and Drugg., June 22, 1901, 995; from Proceedings of the Chemical Society.

Jamaica Dogwood—Constituents.—Paul C. Freer and A. M. Clover have jointly made a chemical investigation of Jamaica dogwood (*Piscidia erythrina*, L.), in the course of which they demonstrated the existence of a large number of interesting crystalline bodies in this bark, which they now describe together with the means employed for their isolation. The more important results of this investigation are the isolation of a new acid, piscidic acid, and the demonstration that

Piscidine, hitherto considered to be the active principle, has no existence in reality, the substance so considered, and described as crystallizing from alcohol in prisms, melting at 192°, consisting in reality of two very distinct crystalline bodies, the one colorless, the other yellow.

The colorless body forms highly refractive rectangular prisms, melting at 201° and having the composition $C_{23}H_{20}O_7$. It is soluble in chloroform, moderately soluble in benzene and in acetic acid, sparingly in alcohol, and insoluble in ether, ligroin and alkali.

The yellow body separates from alcohol in fine yellow needles, melting at 216° and having the composition $C_{22}H_{18}O_6$. It is soluble in benzene and chloroform, sparingly in ether, and insoluble in ligroin. Both of these bodies are found in the chloroform extraction of the bark and are finally separated from each other by fractional crystallization from alcohol. The

Piscidic Acid, isolated for the first time by the authors, is obtained from the aqueous extract of the bark. By the method described it is finally obtained as a mass of radiating needles, which melt at 182° to 185°, and have the composition $C_{11}H_{12}O_7$. It is soluble in water, but insoluble in chloroform, benzol or ligroin. No acid of the composition and properties of the new substance appears in literature, so that the specific name given to it appears to be justified. It is a dibasic acid and its properties are much like those of murcic and saccharic acids. A list of the other bodies and derivatives is appended to the descriptive text in the original paper.—Pharm. Archives, Feb., 1901, 21–28.

Lotus Arabicus—Prussic Acid Evolved from the Leaves.—W. R. Dunstan and T. A. Henry find that the leaves of *Lotus arabicus* evolve prussic acid in considerable quantity when moistened with water and crushed, the

amount being greatest just before the flowering period, and least just after that period. The acid is stated to originate with a yellow crystalline glucoside, $C_{22}H_{19}NO_{10}$, which is named

Lotusin. Under the influence of an enzyme named *lotase*, or of dilute acids, lotusin is rapidly hydrolyzed, with formation of prussic acid, sugar (dextrose), and a new yellow coloring matter.

Lotoflorin, $C_{15}H_{10}O_6$, which appears to be a dihydroxychrysin, isomeric with luteolin, the yellow coloring matter of *Reseda luteola*, and with fisetin, the yellow coloring matter of *Rhus cotinus*. Hydrolysis is only very slowly brought about by emulsin, and not at all by diastase. Lotase appears to be distinct from previously known enzymes; it has only a feeble action on amygdalin, and its activity is rapidly destroyed by contact with alcohol. Old plants of *L. arabicus* contain lotase, but no lotusin. The latter is remarkable as being the only other glucoside than amygdalin or laurocerasin at present definitely known to furnish prussic acid on hydrolysis.—Pharm. Journ., Dec. 22, 1900, 723; from Proc. Roy. Soc., 67, 224.

Macaranga Kino—A New Kind.—D. Hooper calls attention to a new kind of kino which is yielded in the form of odorless and tasteless tears or masses of various shapes by

Macaranga roxburghii, a tree indigenous on the Deccan peninsula. The tears have a fibrous fracture, and when immersed in water or spirit, the outer coating of resin is dissolved and the fibres unravel themselves like a piece of string, ultimately curling back, and giving the tear the appearance of a sea anemone. The solution in water or spirit is of a deep claret color. The kino was found to contain from 6 to 15.2 per cent. of a tannin, from 16.5 to 18.3 per cent. of moisture, and from 50.25 to 70.95 of insoluble gum. The tannin differs from that of Malabar and Bengal kinos in its color reaction with ferric chloride, with which it gives a purplish color and precipitate, and not a green reaction. Other parts of the plant contain tannin, the leaves 9.5 per cent., and the bark 18.4 per cent. Macaranga kino would appear to be closely allied to Butea kino, from which it is distinguished by the fibrous nature of its tears, and its peculiar insoluble, gum which swells without dissolving in water; this consists mainly of pararabin, since it is rendered soluble by heating for a few hours with dilute hydrochloric acid. In its insolubility in both water and alcohol it differs entirely from the various eucalyptus kinos described by J. H. Maiden. Other species of macaranga which are stated to yield a red exudation are *M. denticulata*, *M. indica*, and *M. tanarius*.—Pharm. Journ., May 18, 1901, 617; from Agric. Ledger, 1900, No. 7.

Senna—Chemical Constituents.—Tschirch and Hiepe have made a comprehensive investigation of the chemical constituents of senna. From the aqueous percolate they have extracted, besides *cathartic acid*, a crys-

talline body, giving the same reactions as *senna-nigrin* and having a composition conforming with the formula $C_{14}H_{10}O_5$. From the weak ammoniacal percolate they obtained the so-called *anthrogluco-sennin*, which, however, is composed of several distinct substances. On treating it with ether, a portion enters solution and another remains undissolved. The ether-soluble portion, on boiling with toluene and pouring the solution into petroleum spirit, precipitates *senna-emodin*, while *senna-crysophanic acid* remains in solution and may be obtained on evaporation. The portion insoluble in toluene is a new body which the authors have named *gluco-sennin*. Its composition agrees with the formula $C_{22}H_{18}O_8$, and it is possibly an emodin glucoside. From the portion of anthragluco-sennin insoluble in ether, *senna-isoemodin* is obtained by treatment with acetone and shaking the resultant solution with petroleum spirit. The acetone solution retains a substance which the authors have named *senna-rhamnetin*. Finally, the portion of anthragluco-sennin remaining undissolved after treatment with ether and acetone is a black body which resembles in this and other respects aloe-nigrin. *Senna-nigrin*, however, yields on treatment with alcoholic potash, senna-emodin and senna-chrysophanic acid.—Arch. d. Pharm., *238* (Aug. 31, 1900), 427–448.

Senna—Modern Researches.—A. R. L. Dohme gives an interesting resume of the recent researches of Prof. Tschirch, which although not completed, have cleared up the chemistry of senna to an amazing extent. Prior to these researches, the chemistry of senna stood about as follows: Lassaigne and Feneulle had found *resin*, volatile oil, yellow coloring matter, etc., in the leaves; Bley and Diesel attributed their activity to *chrysoretin;* Von Martins found impure *chrysophanic acid;* Dragendorff named the acitve principle *cathartic acid;* Ludwig found a bitter principle, *sennapikrin;* Seidel found a sugar, *sennite;* Kubly and others analyzed the cathartic acid, but got only figures; Keussler analyzed the chrysophanic acid with the same results, but mentions having found *emodin* in senna; while Aweng has recently declared that the active principle of senna is a glucoside resembling *frangala-rhamnetin*. Tschirch has now obtained from senna a glucoside, which he has named

Anthragluco-sennin, in the form of a brown-black powder that reduces Fehling's Solution. From this he has obtained emodin, melting at 223° C., which he calls

Senna-Emodin, to distinguish it from aloe-emodin and cascara-emodin, which have higher melting points, and chrysophanic acid, melting at 171°–172°, which he calls

Senna-Chrysophanic Acid to distinguish it from Hesse's chrysophanic acid from rhubarb, which melts at 188° C. Tschirch has also isolated from senna a glucoside, which he calls

Glucosennin. It is a yellow amorphous powder, which melts at 260° C.,

but has not yet been completely investigated. Next, he isolated an isomer of senna-emodin,

Senna-Iso-Emodin, differing from the former in being soluble instead of insoluble in petroleum ether. He has furthermore isolated

Senna-Rhamnetin as a red-brown powder, differing from rhamnetin in not fluorescing in sulphuric acid solution. Finally, he has isolated

Senna-Nigrin, an amorphous black powder produced from anthraglucosennin by the action of alkalies, just as aloe-nigrin is produced from aloin. From senna-nigrin, in turn, he has obtained emodin and chrysophanic acid in quantity.

Concerning the pharmacology of emodin, Prof. Tschirch has shown that emodin *does* itself, and pure aloin *does not* produce peristalsis in the intestines. The aloin, just as anthroglucosennin, rhein, frangulin and purshianin, has to be decomposed by the alkalies of the intestinal tract, and the emodin thus set free is what produces the peristalsis that causes the laxative effect of the drug. It seems to the reviewer that a substance so active as emodin should be destined to become a popular addition to the physician's armamentarium. Drugg. Circ., Dec., 1900, 242.

Senna—Emodin Content in Commercial Sorts.—Tschirch and Hiepe have determined the percentage of emodin in various commercial sorts of senna and in senna deprived of resin, and find the latter to contain the least amount, showing that a portion of emodin is sacrificed in the treatment to remove the resin. Alexandria senna contains 1.00 per cent.; Tinnevelly, 0.80 per cent.; Tripoli, 0.86 per cent.; Mecca, 0.97 per cent.; leaves of *Cassia obovata*, 0.70 per cent., and resin-free senna, 0.64 per cent. Senna pods contain 1.15 per cent.—Pharm. Ztg., Feb. 9, 1901, 117.

Senna—Percentage of Ash in Different Sorts.—Henry G. Greenish has determined the ash in numerous specimens of Alexandrian and Tinnevelly senna, and also in single specimens of other varieties, with results shown in the following tables:

TABLE I.

PERCENTAGE ASH IN ALEXANDRIAN SENNA (DRIED AT 105° C.).

No.	Description.	Ash.
1	Picked	11.53
2	Good leaf	12.95
3	Good leaf	11.39
4	Good leaf	11.67
5	Small leaf	11.54
6	"Small out"	11.44
7	"Parv."	14.33
8	Siftings	17.56
9	Second quality, broken leaf	13.45
10	Poor and dusty	19.63
11	Pods	5.56
12	Stalks	8.21

TABLE II.

PERCENTAGE ASH IN TINNEVELLY SENNA DRIED AT 105° C.

No.	Description.	Ash.
13	Very fine picked	13.00
14	Opt.	9.91
15	Good leaf	11.15
16	" "	9.78
17	Medium quality	9.73
18	Inferior discolored	11.05
19	" "	10.20
20	Inferior, few stalks, dusty	10.53
21	Inferior, much stalk	9.54
22	Very inferior and stalky	16.77
23	Stalks	7.32

TABLE III.

PERCENTAGE ASH IN OTHER VARIETIES (DRIED AT 105° C.).

No.	Description.	Ash.
24	Bombay senna	11.94
25	Mecca senna (offered as Alexandrian)	11.72
26	*Cassia holosericea*	13.55
27	*Cassia obovata*	14.90

Nos. 1, 2, 3 and 4 (Alexandrian), and 13, 14, 15 and 16 (Tinnevelly) were all in every respect suited for medicinal use. They show a maximum of 13.00 per cent. and a minimum of 9.78 per cent. of ash, and in all these instances the ash left but a very trifling residue insoluble in hydrochloric acid; Nos. 7, 8 and 9 left distinct residues, in one case (No. 8) amounting to 34 per cent. of the weight of the ash; these residues consisted principally of minute grains of sandy particles of various colors. Of the Tinnevelly sennas, Nos. 20 and 22 left considerable residues undissolved. These results show that the ash yielded by senna leaves is not in itself sufficient to enable one to discriminate sharply between good and bad qualities of the drug, but at the same time it is useful to exclude those inferior samples that contain much sand. It would, therefore, be desirable to introduce a maximum limit for the ash and to require that it should be almost entirely soluble in hydrochloric acid; by this means sand would be excluded, as well as those poor dusty samples, siftings, etc., that contain a large percentage of such insoluble matter. The author, furthermore, shows that the microscopic elements of senna are available for the pharmacopœial characterization of the powder, and he proposes that the following be added to the B. P. description:

"The powder exhibits fragments of epidermal tissue consisting of polygonal cells and bearing stomata and hairs or the scars of fallen hairs. Each stoma is enclosed between or bordered by two cells, arranged parallel to it; the hairs are one-celled, thick-walled and warty. It also exhibits groups of sclerenchymatous fibers, which, however, should not be present in excessive quantity. Powdered senna should yield not more than 14 per cent. of ash, which should be almost entirely soluble in hydrochloric acid." —Pharm. Journ., March 30, 1901, 397–398.

Voandzou—An African Food Plant.—Balland has examined the seeds of *Glycine* (or *Voandzia*) *subterranea*, a plant which is largely cultivated as a foodstuff by the negroes of tropical Africa. Its analysis shows it to contain in one kilogramme almost exactly the quantities and relative proportions of albuminoids, fat, and carbohydrates, which are considered by physiologists to be requisite in a perfect food for the daily consumption of the human organism, the percentage composition being as follows: Nitrogenous matter, 18.6; fat, 6.0; starch, 58.3; insoluble cellulose, 4.0; water, 9.8; ash, 3.3 per cent. The seeds are more or less ovoid, of a red color mottled with black; the umbilicus is white. They yield a white flour with a leguminous taste when raw, but, when cooked with water, the taste is exactly like that of Spanish chestnuts.—Pharm. Journ., June 1, 1901, 693; from Compt. rend., *132*, 1061.

TEREBINTHACEÆ.

Japan Wax—Source, Collection and Preparation for the Market.—The "Bulletin of the Botany Dept.," Jamaica (7, 37), gives the following particulars concerning Japan wax, which is yielded by several species of *Rhus*. The most important of these is *R. succedanea*, which flourishes especially in the western provinces of Japan. The wax is contained in the berries between the kernel and the outer coat. These are gathered, sun-dried and stored in straw until mature, when they are crushed by a wooden hammer in a wooden funnel-shaped trough and winnowed to separate the chaffy husk. The sifted and fanned powder is steamed in hempen sacks laid on bamboo wicker-work placed over a cauldron. The sacks with their contents are then subjected to force in wooden wedge-presses and the escaping wax is moulded for market. Sometimes the flow of wax is hastened by the application of a little oil of *Perilla ocimoides*. This crude wax forms a coarse, greenish, tallow-like-mass, constitutes about 15 per cent. of the weight of the berries and is used in making candles. For special purposes it is refined by melting, pressing through strong cotton sacks and dropping into cold water. The resulting thin flakes are bleached by exposure to the sun in shallow baskets. It is frequently turned and sprinkled with water, and, if necessary, it is remelted. For export the wax is now often cast into large cubes weighing 1 picul (133⅓ lb.), instead of the conventional saucer-shaped cakes 4–4½ inches

in diameter and 1 inch in thickness.—Pharm. Journ., Aug. 11, 1900, 189.

Lithrea Caustica — Poisonous Effect of the Leaves. — According to Herrera the leaves of *Lithrea caustica* (*Litrea venenosa*, Miers), contain a volatile principle (cardol?) to which its property of causing cuticular eruptions, similar to those of the poison sumach, are to be referred. So far, however, only a resin and volatile oil have been determined. The plant is a native of Chili, and is locally known as " Litre." — Pharm. Ztg., Mar. 6, 1901, 196; from E. Merck's Ann. Rep., 1901, 196.

Mastic — Method of Examination. — Having occasion to examine a sample of very light-colored mastic under suspicion of being a substitution, Henry C. C. Maisch looked up the literature upon the subject, and came across some interesting historical data, which he communicates in some detail. The following process was employed for the examination of the suspected sample, its reliability being confirmed by parallel experiments upon several samples of mastic of known quality: Dissolve 1 Gm. mastic in 10 Cc. benzin, add 10 Cc. decinormal alcoholic and 10 Cc. decinormal aqueous potassium hydrate solution, and put aside for 24 hours, occasionally shaking. Then titrate the mixture with decinormal sulphuric acid, using phenol-phthalein as indicator, but adding no water. The difference between 20 and the number of Cc. of decinormal sulphuric acid used multiplied by 28 gives the acid number. Having, however, made a blank experiment (without the addition of mastic), which required 19.9 Cc. of the decinormal acid, the figure 19.9 was employed in place of 20 in making the calculation. In this way he determined the acid number of the suspected sample to be 57.4, according to the following equation: $19.9 - 17.85 = 2.04 \times 28 = 57.4$. Three other samples of mastic gave the acid numbers 70, 58.8 and 58.8 respectively, and these numbers are similar to that obtained by Dieterich for Levantine mastic (65.99).— Amer. Journ. Pharm., April, 1901, 169–171.

"Tutu"—Poisonous Fodder Plants in New Zealand.—T. Hill Easterfield and B. C. Astor have examined three varieties of "tutu," viz.:

Coriaria ruscifolia, *C. thymifolia*, and *C. angustissima*, which cause serious loss of stock in New Zealand, and have isolated from them a glucoside,

Tutin, $C_{17}H_{20}O_7$, along with acetic, gallic, succinic and other acids. From *C. thymifolia*, quercetin or an isomeric compound was obtained; and from *C. angustissima*, a volatile acid, $C_8H_8O_4$, which has not been identified. Tutin was obtained in colorless crystals melting at 208°–209° (uncorr.), and is perceptibly volatile at 120°–130°. Its solubility is 1.9 Gm. in 100 Gm. water at 10°; 1.5 Gm. in 100 Gm. ether at 10°; 8.2 Gm. in 100 Gm. alcohol at 16°. It is very soluble in acetone, sparingly soluble in chloroform, insoluble in benzene and carbon disulphide. A comparison

of the chemical and physical characters of tutin and coriamyrtin, $C_{15}H_{18}O_5$, proved that those substances are not identical. Professor Marshall has found that the action of tutin is similar to that of coriamyrtin, but is more slowly produced, and it is much less toxic. Its action is exerted mainly on the medulla oblongata and the basal ganglia of the brain.—Pharm. Journ., Dec. 22, 1900, 723; from Proc. Chem. Soc., 16, 213.

"Tutu" Berries—Various Uses.—Prof. Kirk has suggested that a valuable tanning extract can be prepared from the bark of a New Zealand plant belonging to the genus

Coriaria, various parts of which are largely utilized by the Maoris. Thus, notwithstanding the poisonous nature of the plant, the juicy fruits, or "tutu" berries, yield by expression an agreeable, non-intoxicating beverage, which, according to Colenso, is consumed with avidity in large quantities. The juice is also used for tatooing, and to sweeten drinking water, and certain sea-weed jellies; the root is eaten in New Plymouth, and from the hollow stems flutes are made. On the chance of establishing a new industry, the attention of tanners and others was invited to this plant by Professor Easterfield and Mr. Acton at a meeting of the Wellington Philosophical Society, at which, in the course of the discussion that took place, it was mentioned that a delicious wine was prepared from the juice of the tutu berries, while another speaker stated that in the early days of Wellington, the members of a family were poisoned, and nearly lost their lives through eating pie made of the berries.—Pharm. Journ., Dec. 1, 1900, 619; from Austral. Journ. Pharm.

PIPERACEÆ.

Pepper—Cultivation in Java.—J. Bosschor, a pepper planter in Java, describes at some length the method of cultivating pepper. Like most plants that have long been cultivated the pepper plant exists in several varieties, for each of which a special mode of cultivation may be more suitable than others. It is quite possible that, as a general rule, the differences in the various methods of cultivating plants of the same species growing in different parts of the world are due to this cause, viz., particular varieties requiring special modes of treatment. The pepper plant, except when it is young, has no need of shade, which produces more vegetative growth, but less fruit. The question of finding a suitable manure is one that requires investigation; one thing is certain, that even where the soil is rich it is advantageous to manure it. The Chinese use a mixture of burnt earth and wood for the purpose; the value of this manure is attributed by some to the charcoal it contains, but the author considers it due to the ammonia produced during the heating process being absorbed by the charcoal. The plant *Uncaria gambier* is advantageously cultivated side by side with the pepper plant; the leaves of the former are spread on the ground, and among the many advantages of this practice are men-

tioned the hindering of evaporation from the soil, the choking of weeds and the covering of the manure layer from the damaging action of heavy rains. The drying of black pepper may be effected simply by exposing the fruits to sunlight; it is well to break off the stalks by force, and remove them by sifting before the drying process is completed. After some time, often on the first or second day, the fruits begin to wither, hence the fruits are sometimes immersed in boiling water to hasten the withering. The tendency of black pepper to become covered with moisture in damp weather has led to the practice of subjecting the fruits to the smoke from green wood; this step has the advantage that it causes the fruits to dry quickly, and does not expose them to moisture. In the preparation of white pepper the characteristic sweetish taste and spicy aroma of the pulp, due to the presence of a volatile oil, is lost during the drying process, giving place to the characteristic taste and smell of the pepper of commerce. The pericarp is removed by soaking the fruits in running water for five or six days; ferments become active and the pulp gradually softens so that it is eventually washed away. The paper concludes with a description of the ravages of beetles, locusts, and other enemies of the pepper plant, and a discussion of the commercial aspects of pepper cultivation.—Pharm. Journ., Nov. 17, 1900, suppl. *b.;* from Rev. Cult. Colon., 7, 581.

Piper Methysticum—Structure of the Root.—Henry Hollen contributes an interestihg microscopical study of the root of kava-kava, in which he points out that transverse sections of roots a centimeter in diameter show in the same plant two distinct types of structure so strikingly different that one would be inclined to regard the drug as mixed were they to be first observed in separate specimens. These two types are shown in handsome plate illustrations, which clearly exhibit the distinctions described in detail in the author's paper. The present study is confined to the smaller roots and has not been extended to the larger ones—in which a more complicated structure exists—because it was deemed hardly profitable to trace the increasingly difficult features of the larger organs in commercial materials.—Pharm. Archives, July, 1900, 121–125.

RHAMNACEÆ.

Buckthorn and Cascara Barks—Comparative Physiological Effects.—In connection with his paper on the comparative value of acetic acid and alcohol as menstrua for extracting buckthorn and cascara barks (see Acetic Fluid Extracts under "Pharmacy") Dr. Edward R. Squibb takes the opportunity to make a comparison of the medicinal effects of these two official varieties of *Rhamnus* as they have developed in the course of his experiments. He finds that while cascara has nearly double the activity of buckthorn, the equivalent dose being 0.3 Cc. of fluid extract of cascara to 0.5 Cc. of fluid extract of buckthorn, cascara gripes while buck-

thorn does not. The effect of a good corrigent to prevent the griping is therefore needed in the case of cascara, but not in that of buckthorn, which moreover is free from the disagreeable bitter of the cascara. Cascara is an evacuant, and is liable to leave a lingering action on the lower bowel. Buckthorn is not a good purgative, or even a good evacuant: but it is an excellent mild laxative, and in effect is not unlike the general effect of blue mass. While cascara is not a therapeutic duplicate of senna, it is much like it in the character and quality of its effects, with the advantage of smaller dose. Buckthorn bears a somewhat similar relation to rhubarb, but is more simple and mild in operation, is more limited in application, and required in much smaller doses for its best effects. A very good way, if not the best way, to use the fluid extract of buckthorn to correct a constipation is to give 0.5 Cc. diluted with about 30 Cc. of water after each meal for one day, then reduce the number of daily doses to two or one a day, and the intervals to alternate days, and finally to once or twice a week, until the natural habit is established—and no longer.—Amer. Journ. Pharm., July, 1900, 318–319.

Cascara—Adulteration of the Powder with Frangula Bark.—It is stated by Emile Perrot that powdered cascara sagrada is sometimes adulterated on the continent of Europe with powdered frangula bark. He gives figures of the microscopic elements of the two barks, which must be consulted in the original paper, and states that cascara bark may be distinguished by its peculiar sclerogeneous cells, either isolated or in masses. A portion of the powder is moistened with solution of chlorinated potash, which immediately colors the parenchymatous elements of cascara yellow, while the corresponding cells of *Rhamnus frangula* develop a deep red tint. The powder of the latter bark contains numerous collenchymatous cells and corky layers markedly impregnated with red-brown tannin, which are not present in the bark of *Rhamnus purshiana.* — Pharm. Journ., March 2, 1901, 261; from Journ. Pharm. Chim. (6) *13*, 161.

Rhamnus Catharticus—Proximate Constituents.—Messrs. Tschirch and Polacco determine the following proximate constituents of buckthorn bark: The purgative principle, *emodin;* three yellow coloring matters—*rhamnocitrin*, *rhamnolutin* and *rhamnochrysin; chlorophyll;* a *violet coloring matter* of undetermined composition: uncrystallizable *sugar;* a *pectin*, gum-like substance; and a fat.—Arch. d. Pharm., *238* (Aug. 31, 1900), 459–476.

EUPHORBIACEÆ.

Aratacio—A Brazilian Tonic and Aphrodisiac.—Jules Poisson has traced the root bark of a Brazilian plant, held in high estimation under the name of "aratacio," to *Sagotia racemosa*, Baill. An aqueous decoction is employed as a cosmetic lotion for the complexion and to remove wrinkles, and a tincture, prepared with rum, is used internally as a tonic, stimulant,

and aphrodisiac. It appears that considerable quantities have already been exported to Europe, and the author suggests that it may repay to make a chemical investigation.—Pharm. Journ., Oct. 20, 1900, 440 ; from L'Union Pharm., *41*, 352.

Hura Crepitans—Isolation of the Toxic Principle of the Latex.—J. J. Surie has succeeded in isolating the toxic principle of the milky juice of *Hura crepitans* in the form of a volatile colorless fluid, which he calls

Hurin. It has an acrid burning taste, is insoluble in water, but soluble in alcohol, ether, and chloroform. It is not identical with cardol, but appears to be closely related to the acid of croton oil. Although volatile, hurin cannot be isolated by distillation, as it undergoes decomposition. To obtain it, the juice was extracted with ether, the ether extract purified with alcohol and lead hydroxide, from the filtrate of which impure hurin was separated, and subsequently purified by further treatment with ether. In addition to this body, the juice contains a considerable amount of caoutchouc. The watery portion of the juice, after coagulation and filtration, is free from toxic properties.—Pharm. Ztg., *45*, 468 ; from Nederl. Tijdsch. v. Pharm., 1900, 107.

Lac—Production in Assam.—A recent report of the Assistant Director of Agriculture in Assam deals in detail with the lac industry there. Lac occurs in its natural state in various parts of the forests of Assam, as well as of Burma, but chiefly in parts of the Khasi and Garo Hills, and the export in recent years has averaged 16,000 maunds, or something over 500 tons, but in some of the forests, owing to the ravages of the Kolaazar epidemic and de-population, the production is declining. The production in Manipur is not sufficient for the local needs, and quantities of the lac are sent there from the Kubo Valley of Assam. The lac is all sent away from Assam in the crude form, or stick lac ; shell and button lac are made, to some extent, but lac dye is not now prepared anywhere in Assam, and lacquer wares are only produced in two places, so that this once considerable industry would seem to be dying out. The black lacquer of Manipur is really not a lac preparation at all, but only the juice of a tree sent from the Kubo Valley. In Assam the lac is usually collected twice a year, first in May and June, and then in October and November. The first is mainly used for seed purposes, while the second forms the export. A few days after the collection, pieces of stick lac containing living insects are tied on to the branches of the trees on which the next crop is to be grown. The usual plan is to place the lac in small bamboo baskets and tie these on the twigs of the trees. The insects soon crawl out, and spread over the young branches, on which they promptly begin to feed, and secrete the resin. This is allowed to go on for about six months, when the lac is collected ; but if the secretion has been defective or insufficient, the insects remain undisturbed for another six months.—Pharm. Jour., Nov. 3, Suppl. 6.

Manihot Glaziovii—Experimental Cultivation in Brazil.—According to a British consular report, the Manicoba rubber tree, *Manihot glaziovii*, is being experimentally cultivated on many estates in the Rio de Janeiro district of Brazil, and the results are awaited by the planters with much interest. In Ceará its success is apparently assured, but whether the soil and climatic conditions of Rio de Janeiro are equally favorable for its development remains to be seen. As the plant does not arrive at a mature productive state before the third or fourth year, it will be a year or two before the result of the experiment will be known. The cultivation of the plant is said to be both easy and inexpensive, one man alone being able, without great exertion, to tend 4,000 trees. They are planted at intervals of two to two and a half meters, and it is stated that they will continue to yield for a period of fifty years. At the end of three years the yield should average about 50 grammes per tree, or for a plantation of 4,000 trees 200 kilos., at the end of four years 400 kilos., at the end of five years 600 kilos., and from the sixth year onward 1,000 to 1,400 kilos.—Pharm. Journ., Aug. 18, 1900, 233.

Sweet Cassava—Confirmation of the Presence of Hydrocyanic Acid.—Professor Carmody has confirmed the results of Francis as to the presence of prussic acid in sweet cassava, the proportion found varying from 0.005 to 0.019 per cent. He finds also that in sweet cassava the prussic acid is not uniformly distributed throughout the tuber, but in bitter cassava it is uniformly distributed, or nearly so, and an analytical means is thus afforded of distinguishing between sweet and bitter cassava. Thus, the inner part of sweet cassava yielded from 0.003 to 0.015 per cent. of prussic acid, whilst the skin and outer cortical layer of the tubers yielded from 0.014 to 0.042 per cent. On the other hand, the inner part of bitter cassava yielded from 0.013 to 0.037 per cent., whilst the skin and outer cortical layer yielded from 0.012 to 0.035 per cent. It is customary to remove the skin of sweet cassava before boiling, and the results recorded show that to be a wise precaution. The results of experiments indicate that the whole of the prussic acid cannot be removed from grated cassava by a two hours' extraction with water. It is believed that part of the acid may be formed by fermentative change, in which case "cassava starch on keeping would be likely to be more poisonous than when freshly prepared."—Pharm. Journ., Sept. 15, 1900, 313; from Lancet, No. 4,019, p. 736.

URTICACEÆ.

Catha Edulis—Presence of a New Caoutchouc Substance in the Leaves.—In continuation of his experiments, Albert Beitter finds that the previously described alkaloid, *katine*, is associated with a *new caoutchouc substance*, $C_{10}H_{17}O$, which softens at 50° C., and melts at 120° C. Traces of a volatile oil, lighter than water, which darkens on keeping, ultimately depositing crystals, and has a powerful odor, were also obtained. The alka-

loid is present only in very small quantity, the leaves from Aden yielding only 0.076 per cent., while those from Harrar yielded only one-half as much. It is purified with difficulty, and gives precipitates with the usual alkaloidal reagents, but only when present in fairly strong solution.—Arch. d. Pharm., *239* (Febr. 8, 1901), 17–33.

Morus Rubra, L.—Occurrence in Wisconsin.—L. S. Cheney has recently been able to confirm the occurrence of the red mulberry as an indigenous tree in Wisconsin, which father Th. Bruhin had reported as occuring in Grant County in 1878, a statement overlooked or ignored by later writers. While widely distributed in central North America, extending from the Atlantic seaboard to the Mississippi river and from the Gulf region to southern Ontario, it is of rare occurrence in the extreme northwestern portion of this region, but has been known to grow wild in the southeastern portion of Minnesota, although in very limited quantity.—Pharm. Rev., Mar., 1901, 117.

CONIFERÆ.

Turpentines.—Constituents, etc., of Different Kinds.—A. Tschirch, in conjunction with G. Weigel, has subjected Strassburg and Larch turpentine, and, with G. Bruening, Canada turpentine to chemical investigations, with results as follows:

Larch Turpentine—the oleo resin of *Larix decidua*—contains from 60 to 64 per cent. of acid resins soluble in soda, from 20 to 22 per cent. of volatile oil, and from 14 to 15 per cent. of indifferent resin. The acid resins consist mainly of two isomeric amorphous bodies α- and β-larinolic acid, $C_{18}H_{26}O_2$, and a smaller quantity of the crystalline laricinolic acid, $C_{20}H_{30}O_2$. The greater portion of the volatile oil boils between 155° and 170°; a smaller quantity of higher boiling sesquiterpene commencing to boil at 190°. The recently distilled oil has the sp. gr. 0.872, and possesses a characteristic turpentine odor. It is soluble in all proportions in alcohol and other solvents.

Strassburg Turpentine—the oleo resin of *Abies pectinata*—contains from 8 to 10 per cent. of an acid resin, "abieninic acid," $C_{13}H_{20}O_2$; from 1.5 to 2 per cent. of a crystalline acid resin, "abietolic acid," $C_{20}H_{28}O_2$; from 46 to 50 per cent. of two amorphous isomeric acid resins, "α- and β-abietinolic acid, $C_{16}H_{24}O_2$; from 12 to 16 per cent. of a neutral resin," abieto-resin; and from 28 to 30 per cent. of volatile oil, together with traces of succinic acid, bitter principle, coloring matter, moisture and impurities. The oil when recently distilled has the sp. gr. 0.860, boiling between 148° and 165° C.; the major fraction distils between 162°–163° C. It has a greenish fluorescence and a lemon-like odor. When the oleoresin is distilled with potash a pleasant rose or orange-flower odor is developed, possibly due to the liberation of a fragrant alcohol.

Canada Turpentine or Balsam contains about 63 per cent. of acid

resins, from 23 to 24 per cent. of volatile oil, and from 11 to 12 per cent. of indifferent resin. The acid portion consists of four acids, of which one —canadinic acid, $C_{19}H_{34}O_2$—is obtained by treating the oleoresin with ammonium carbonate, with which it combines; a small amount of crystalline canadolic acid, $C_{19}H_{28}O_2$, and two amorphous isomeric acids—α and β canadinolic acids, $C_{19}H_{30}O_2$—which constitute the main portion of the acid resins. The indifferent resin has the formula $C_{21}H_{40}O$. The greater part of the volatile oil boils between 160° C., and 167° C.—Arch. d. Pharm., 238 (Aug. 31 and Sept. 26, 1900), 401, 411 and 487.

Bordeaux Turpentine.—Tschirch and Bruening find this oleo resin to have the following composition: 6 to 7 per cent. of pimarinic acid, $C_{14}H_{22}O_2$; 8 to 10 per cent. of pimaric acid, $C_{20}H_{30}O_2$; 48 to 50 per cent. of alpha- and beta-pimarobic acids, $C_{18}H_{26}O_2$; 5 to 6 per cent. of bordo-resin, together with traces of succinic acid. The acid resins are soluble in soda solution, the pimarinic acid being separable from the other two by its property of forming with ammonium carbonate a water-soluble double salt. The volatile oil consists of two fractions, the larger fraction, amounting to about 85 per cent. of the whole, distilling easily.—Arch. d. Pharm., *238* (Nov. 10, 1900), 630.

Finnan Turpentine, the oleo-resin of *Pinus sylvestris*, is found by Tschirch and Niederstadt to consist of: 1.5 per cent. silveolic acid, $C_{14}H_{20}O_2$; 58 to 60 per cent. of α-silvinolic acid ($C_{15}H_{26}O_2$) and β-silvinolic acid ($C_{14}H_{24}O_2$); 20 to 21 per cent. of resene; 15 per cent. of volatile oil; and traces of bitter principle and succinic acid. Silveolic acid is crystalline; α- and β-silvinolic acids are both amorphous. The volatile oil has the sp. gr. 0.840 at 15° C., is soluble in all proportions in alcohol, ether, and chloroform, and is neutral when recently distilled, but becomes acid when exposed to the air.—Arch. d. Pharm., 239 (April 30, 1901), 167.

Jura Turpentine—Composition.—A Tschirch and E. Bruening have determined the following constituents of the oleo-resin of *Picea vulgaris:* From 2 to 3 per cent. of picea-pimarinic acid, $C_{18}H_{20}O_2$; from 1.5 to 2 per cent. of picea-pimaric acid, $C_{20}H_{30}O_2$; from 48 to 50 per cent. of α- and β-picea-pimarolic acid, $C_{25}H_{44}O_2$; from 32 to 33 per cent. of volatile oil; from 10 to 12 per cent. of resene, $C_{21}H_{36}O$; and traces of succinic acid, coloring matter and bitter principle.—Arch. d. Ph., *238* (Nov. 10, 1900), 616.

Russian Turpentine Balsam—Inferiority Due to Methods of Collection.—The oleoresin of *Pinus sylvestris* as obtained in Russia has generally been considered inferior in quality to the turpentine of French and American sources, obtained from other species of *Pinus*—the Russian variety having been found to yield only 7 to 8 per cent. of oil, while that from other sources yields 13 to 19 per cent. W. E. Tischtschenko has investigated the matter and finds that the inferiority of the Russian "balsam"

is due to improper methods of collection. When carefully collected it compares favorably with Canada balsam, yielding 37.2 per cent. of crude oil, 34.6 per cent. when rectified over lime, and 62.8 per cent. of colophony. Canada balsam yielded the author 29.9 per cent. of oil, or 29.3 per cent. purified over lime, and 70 per cent. of colophony. The optical rotation of the Russian fir-tree balsam was —8.5° of the oil distilled from it —30.4°, and of the resin — 3.17° ; while the optical rotation of the Canada balsam was + 5.7°, of the oil —31.8°, and of the resin + 15.8°.—Pharm. Journ., Oct. 6, 1900, 388 ; from Chem. Zeitg. Repert., 24, 152.

Venice Turpentine—Spurious Sorts.—According to G. Fabris, spurious Venetian turpentine, consisting of mixtures of rosin, oil, colophony and oil of turpentine, have for some time past found their way into commerce, their color and consistency depending on the relative proportions of the several constituents. In general, such products are very thick and have a mingled odor of their components. If 5 Gm. of genuine Venice turpentine be dissolved in 20 Cc. of 95 per cent. alcohol, and, after adding a few drops of phenolphtalein solution, the liquid be rendered alkaline with sufficient 10 per cent. solution of potassium hydroxide, a clear solution results, whereas the spurious article becomes turbid, and, on standing, oily drops of rosin oil separate.—Am. Journ. Pharm., April, 1901, 198 ; from Annals die Lab. Chim. Centrale, 1900.

Norwegian Tar—Chemical Composition.—K. Ström has subjected Norwegian tar, which is obtained from the roots of *Pinus sylvestris*, to chemical investigation. It is a syrupy liquid, of a reddish-brown color, has a very acid reaction, has the sp. gr. 1.068 at 15°, and is soluble in alcohol, acetone, ether, chloroform, and in benzene. Besides crystals of pimaric acid, which are held in suspension, the tar contains 4.70 per cent. of volatile acids, 10.94 per cent. of phenols, and 60.80 per cent. of hydrocarbons. Among the acids are: Formic, acetic, propionic, butyric, valerianic, methyl-proply-acetic, normal caproic, normal caprylic, oenanthylic, and probably caprinic and pelargonic acids. Among the phenols are cresol, guaiacol, creosol, ethylguaiacol, propylguaiacol, and two phenols, $C_{11}H_{16}O_2$ and $C_{12}H_{14}O_2$. Of the hydrocarbons, 14 per cent. are solid and 86 per cent. are liquid.—Chem. News., Feb. 1, 1901, 60 ; from Arch. de Pharm., *237*, 525.

Kauri Copal, the resin of *Dammara australis*, is found by Tschirch and Niedentadt to have the following composition: 1.5 per cent. of kaurinic acid, $C_{10}H_{16}O_2$; 48 to 50 per cent. of α- and β-kaurolic acids ($C_{12}H_{20}O_2$) ; 20 to 22 per cent. together of kaurinolic acid ($C_{17}H_{34}O_2$), and kauronolic acid ; 12.2 per cent. of resene ; 12.0 per cent. of volatile oil, and 0.5 to 1 per cent. of bitter principle. With the exception of the kaurinic acid, all the acid resins are amorphous. The volatile oil has a pleasant, lemon-like odor, the sp. gr. 0.835 at 15° C., boils at 150° to 160° C., and is neutral when first distilled, but rapidly resinifies and becomes

acid on exposure to air. It is soluble in all proportions in alcohol, ether, and chloroform.—Arch. d. Pharm., *239* (March 25, 1901), 145.

Sandarac—Spurious Article in the Austrian Market.—Rudolph Haüke calls attention to a spurious article of sandarac which, although apparently an unusually fine sample, in rounded and elongated tears, of a pale lemon yellow color, brittle and producing a pulverulent fracture, aroused his suspicion because on chewing it adhered unduly to the teeth. On examination it was found to have a markedly lower melting point than true sandarac, melting on the water-bath, whereas the genuine article melts at 135° C., and is not materially altered at 130° C. Its behavior towards solvents—carbon disulphide, glacial acetic acid and petroleum ether is also different from true sandarac, while its acid number is abnormally high, being 169, instead of 136 to 140 of the genuine article. The spurious sandarac is evidently yellow colophony, and is derived from Spain.—Oester. Zeitschr. f. Pharm., *54*, 124.

B. Animal Drugs.

Sponges—Sterilization.—Elsberg gives the following method for sterilizing sponges, which he states to be entirely satisfactory: The sponges are first freed from lime and dirt by soaking for twenty-four hours in an 8 per cent. HCl solution; they are then thoroughly washed with water, and then boiled for five to twenty minutes in the following solution: Caustic potash, 10; tannin, 20; water, 100. Afterwards they are washed in sterile water, and carbolic or sublimate solution, until free from the dark brown caustic solution, finally kept immersed in 2 to 5 per cent. phenol solution. By this treatment they lose none of their physical properties, and sponges infected with staphylococcus, streptococcus, anthrax bacilli and spores, were found to be perfectly sterilized by the process — Pharm. Journ. May 11, 1901, 601; from Centralbl. f. Chirurg., through Quart. Med. Journ. *9*, 167.

Honey. — Satisfactory Commercial Quality. — Charles H. LaWall and Robt. C. Pursel, in an examination of ten samples of honey, representing several thousand pounds, found this product to conform to the U. S. P. requirements in every respect. The specific gravity varied from 1.4277 to 1.4904; the ash content averaged 0.09 per cent. — Proc. Penn. Phar. Assoc., 1900, 161.

Bees' Wax—Precautions to be Observed in its Analysis.—J. Werder emphasizes the need of careful attention to details in conducting the process of saponification in the analysis of bees' wax. He finds that the saponification equivalent is markedly influenced by the duration and method of applying heat during the process. The method of Hübl, consisting in heating with alcoholic potash for forty-five minutes on the water-bath, gives results which, according to the author, are invariably too low.

Buchner, on the other hand, advocates heating for one hour directly over the flame, the flask being supported on the customary wire-gauze. The author finds that Buchner's method alone, of the many suggested, gives results which are reliable, and he advocates its general adoption. Operating on the same waxes, he has obtained with Hübl's method figures which are markedly lower for the ester number, compared with those obtained by the Buchner method. He further notes that when boiling water is added to the alcoholic solution of saponified pure wax, the liquid remains quite clear, although much diluted and even after cooling. In the presence of paraffin, however, a distinct turbidity occurs, even with a small amount of the impurity. This is increased in proportion to the amount of adulterant present. He is of opinion that the determination of the proportion of ether-soluble constituents, after saponification by heating over the naked flame, will afford in practice useful data. He finds that genuine waxes yield from 48.55 to 53.01 per cent. of ether-soluble matter which melts between 71° and 74° C. Certain waxes are met with which permit of the addition of 5 per cent. of paraffin without giving evidence of the addition by this test, but these are exceptional, and the adulteration is revealed by other factors in the analysis. To determine the amount of ether-soluble unsaponifiable matter, he heats 2 Gm. of wax with 5 Cc. of alcoholic potash and 15 Cc. of alcohol, in a 70 Cc. flask fitted to a reflux condenser, and supported on a wire gauze over the naked flame for one hour. The liquid is then transferred to a capsule, and evaporated to 15 Cc. on a sand bath. The residue is mixed with sand, extracted with ether in the usual manner in a Soxhlet, the ethereal extract evaporated, dried at 100° C. and weighed.—Pharm. Journ., Feb. 23, 1901, 192; from Mon. Scientif. (4), 15, 128.

White Wax—Determination of Constants in Commercial Samples.—Henry C. C. Maisch records the results of an examination of three samples of white wax, undertaken mainly with the object of ascertaining whether it is advisable to include the determination of the acid and saponification numbers in the pharmacopœial requirements for yellow and white bees' wax and spermaceti. All three samples (respectively designated 1, 2 and 3) had a lower specific gravity than is recognized by the U. S. P. (= 0.965–0.975); their melting points were practically the same, and they were all free from admixture with paraffin. In their behavior to sulphuric acid at 160° C. they differed to some extent, Nos. 1 and 2 turning brown, while No. 3 was blackened and evolved sulphurous acid. The author's results are here condensed as follows:

Sample.	Color.	Sp. Gr. 15° C.	Melting Point.	Acid Number.	Ester Number.	Saponification Number.	Proportional Number.
1	Pure white	0.9623	64° C.	19.209	76.646	95.857	3.99
2	Yellowish shade	0.9545	63.5-64° C.	19.503	72.873	91.376	3.73
3	Decided yellow tint..	0.9432	63.5-64° C.	18.309	47.623	65.932	2.6

v. Hübl and Allen use the following numbers for white and yellow wax :

	Acid Number.	Ester Number.	Saponification Number.	Proportional Number.
White wax—chemically bleached.	24.	71.	95.	2.96
Yellow wax	20.	75.	95.	3.75

The author concludes that inclusion of the acid and saponification numbers in the pharmacopœial description of the waxes and spermaceti is a step in the right direction. The processes are easily carried out, and the requirement might with advantage be extended to all the fat oils belonging to this group.—Proc. Penna. Pharm. Assoc., 1900, 130–132.

Cod-Liver Oil — Therapeutic Constituents and Value. — Dr. R. S. Mitchell has written a brief paper on cod-liver oil, its constituents and therapeutic uses, which merits the attention of modern polypharmacists. He says there is hardly a remedial agent more universally used than cod-liver oil. The medical profession, which is not noted for its unanimity upon subjects therapeutic—or other subjects for that matter—recognizes its value almost without exception. In all wasting diseases, in tuberculosis, in rachitis, in convalescence from acute diseases, it is of great value. It seems to have been taken for granted that the greater part of cod-liver oil consisted of olein, probably because olein forms so large a proportion of the more common oils. The older chemists had conceived this view, and for many years it does not seem to have been questioned. Chemists paid but little or no attention to an analysis of the oil itself, but were persistently looking for some "active principle," upon the presence of which the peculiar therapeutic value of cod liver oil was supposed to depend. And many such "active principles" were found, as iodine, phosphorus, morrhuol, gaduol, trimethylamine, asseline, amylamine, and many others. It is true that the oil contains traces of iodine and phosphorus, but its efficacy does not depend on their presence. Not only is the amount taken

into the system in this way too small to produce any visible effect, but iodine and phosphorus, given in other ways, do not produce such an effect as does cod-liver oil. Gaduol and many other so-called "active principles" are probably only ptomaines, resulting from retrograde changes in the albuminoid constituents of the livers before the oil is expressed, or in the oil afterward. They are thoroughly unfit to administer, and possess no therapeutic property. Yet these "active principles" are a part of the stock in trade of most of the pharmaceutical establishments, each house seeming to espouse the cause of some "active principle" as being the only true one. Heyderdahl has discovered in the oil two hitherto unknown acids—therapic and jecoleic—and that what was hitherto considered olein is in reality therapin and jecolein, which constitute 40 per cent. of the oil. Olein is not present at all. There is no reason to doubt the accuracy of this observation, and the latest and most elaborate analyses of cod-liver oil render it certain that no "active principle" is present; that it is a food pure and simple; that its value consists in its easy assimilability—probably due to the instability of the glycerides of the two new acids mentioned—and that to secure the best results it must be pure and unchanged. Hence, all concoctions of cod-liver oil, such as emulsions, mixtures containing hypophosphites, pancreatin, iron, and many other agents, are objectionable. Cod-liver oil should not be mixed with anything unless the mixture is made immediately before it is taken. — West. Drugg., Feb., 1901, 68.

Egg Yolk—Protein Constituents.—Thomas Osborne and George F. Camp have examined the yield of hen's eggs in order to determine the kinds of protein matter contained therein. They find that sodium chloride solution dissolves from egg yolk a large amount of protein matter which has the properties of a globulin, being precipitated by diluting or dialyzing its solutions. The substance soluble in salt solution consists of a mixture of compounds of protein matter with lecithin. Preparations of these compounds contain from 15 to 30 per cent. of lecithin. The more soluble products obtained by fractional precipitation contain larger proportions of lecithin than the less soluble; that is, they are more acid compounds; they might well be called lecithin-nucleo-vitellin. The lecithin thus combined is not removed by ether, but readily by alcohol. The insoluble lecithin-free proteid, obtained by treating the lecithin compounds with alcohol, has a constant composition when obtained from successive fractional precipitations of the lecithin compound.—Pharm. Journ., Dec. 29, 1900, 753; from Journ. Amer. Chem. Soc., *22*, 413.

Civet—Source of the Supply from Abyssinia.—The British consular agent at Harrar states that the civet exported from Abyssinia to Europe and America is imported into Abyssinia from the Galla countries. The animal is kept by the Gallas for the purpose of supplying this secretion, but the demand is said to be decreasing and the prices correspondingly low.—Pharm. Journ., Nov. 10, 1900, 521.

INORGANIC CHEMISTRY.

General Subjects.

Volumetric Tests—Relation to the Official Temperature.—In his paper on the most suitable temperature for specific gravity work (which see), Oswald Schreiner expresses the conviction that the official temperature of 15° C. for such work must be abandoned in favor of a more convenient temperature, as has been done long ago by practical workers. In his present paper he discusses the influence which this change in the official temperature will have on the volumetric tests, since all volumetric instruments are graduated at 15°, and the argument has been brought forward that if such a change were made by the Pharmacopœia, all instruments would have to be regraduated or calibrated, and result in endless confusion. Discussing the question entirely from the standpoint of the pharmacist or pharmaceutical chemist and not from that of the "seeker of the last decimal place," the author reaches the following conclusions: 1. Measuring instruments graduated at 15° can be used at any other temperature without influencing the final result of a volumetric estimation. 2. If a solution be made up and used at another temperature an error results, but this is often no larger than is occasioned by irregularities in the bore of the burette.

The temperature at which the instruments were graduated does not come into consideration at all, the only requirement being that they were all graduated at the same temperature. Consequently it is only necessary to place a precautionary note at the beginning of the chapter on volumetric solutions in the U. S. P., as follows: "All volumetric solutions should be prepared as near as possible to the temperature at which they are to be used."—Pharm. Rev., Nov., 1900, 503–507.

Indicators—Wide Occurrence in Nature.—In the course of work on a black cow-pea bean, G. S. Fraps' attention was attracted by the change from black to red which took place when it came in contact with acid. This and other similar observations led him to investigate the subject of coloring-matters which might be made to serve as indicators, and he finds such to be of very common occurrence in nature. Some seventy-four kinds of colored flowers, both wild and cultivated, the leaves of five varieties of coleus, the cow-pea bean, the blackberry, mulberry, smilax berry, strawberry, and the red beet were extracted with water or diluted alcohol, and the extract tested for indicators. In only three cases did the extract not become one color when acid and another when alkaline, and, as a rule, the coloring-matter was fairly sensitive as an indicator, being changed by from less than one to two drops of $\frac{N}{10}$ ammonia solution. Some of the

changes were very sharp, and many of the colors were very beautiful, and, again, in some cases the color passed through several stages in going from acid to alkaline, or the reverse. He was thus enabled to group the different materials in four classes:

Class I.—*Extract not affected by acid or alkali.* To this belong the orange flowers of *Styloxanthus biflora*, the yellow ones of *Chrysogonum Virginianum*, and the leaves of a smooth, red variety of *Coleus*.

Class II.—*Extract colorless when acid, yellow when alkaline.* The flowers in this class were yellow or orange, with a single exception—namely the wild daisy. The other members of this class are, the stamens of *Begonia* and of *Solanum Carolinense*, the petals of *Canna*, of *Œnothera sinuata*, of *Hypoxis erecta*, of buttercups, of a yellow wild flower, of an *Allamanda*, and the leaves of the yellow *Coleus*.

Class III.—*Extract red (or a shade of red) when acid, yellow when alkaline.* This includes twenty-one members—the pink, rose, pink larkspur, crimson clover, phlox, 2 varieties of begonia, double oleander, a *Euphorbia*, *Spensonia goligefolia rosa*, *Clerodendrum* and *Silene Virginica*, etc.

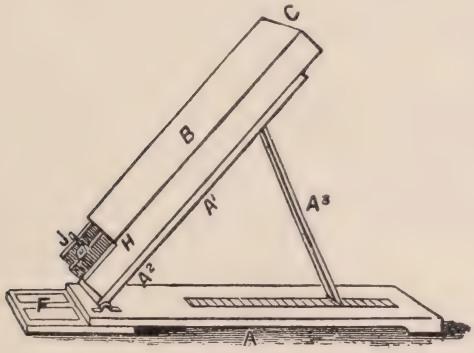
Class IV.—*Extract red when acid, green when alkaline.* This class includes thirty different materials, among which red clover, scarlet sage, Canterbury bell, rose geranium, gladiolus, verbena, sweet peas, passion flowers, *Specularia perfoliata*, *Ruellia ciliosa*, *Runella vulgaris*, nasturtium, the black cow-pea bean, etc.—Finally, the author mentions a miscellaneous group, as

Class V, which includes all those materials which cannot be classed in the other four classes, and yet are not sufficiently alike to be classed into groups. Among these the red sage, scarlet geranium and amaryllis flowers may be mentioned, together with red beets, blackberries, strawberries, mulberries, smilax berries and the brown cow-pea bean.—Amer. Journ. Pharm., April, 1901, 174–179.

Tintometer—An Accurate Instrument for Measuring Tints and Shades of Color.—Oswald Schreiner describes a tintometer, the invention of J. W. Lovibond, by the aid of which it becomes possible to accurately measure the depth of color in liquids and solids, in degrees based on a standard scale consisting of colored glasses numbered according to their depth of color. The instrument shown in the accompanying cut (Fig. 48) is simplicity itself, its essential part being the standard glasses. It consists of a double parallel sided, wooden tube, ending in an eye piece at one end and in equal apertures for viewing the color to be measured, and the glasses used as standards at the other. Only three color-scales are required for ordinary work, the red, yellow and blue. Each of these scales consists of slips of glass, all of the same color but differing in depth, these differences being perfectly regular and forming degrees or units. The intervals be-

tween the units are the smallest differences between which the normal vision can discriminate in the deeper shades of glass colors; these are subdivided into tenths as the shades get lighter, and ultimately into hundredths in the very light shades. Not only is this difference in depth of color a regular one and uniform in all three scales, but there is also a direct color equivalence among the numbers in all three scales; that is, a given number of units in one scale have an equivalence of color value in

FIG. 48.



Tintometer.

relation to the same number of units in each of the other two scales, so that, upon combination of equal units of any two, or of three, a color nomenclature is founded which consists of eight fundamental terms by means of which every possible color can be measured and a definite numerical value of the tint given. For the detailed explanation of the uses and application of the tintometer reference must be had to the author's paper in Pharm. Rev., Febr., 1901, 61–66.

Minerals — Spectrographic Analysis. — W. H. Hartley and H. Ramage point out that some of the rare earths are very difficult to detect, and others more widely diffused are not easily separated and recognized either by the ordinary methods of chemical analysis, or by spectroscopic examination. In a simplified method of obtaining oxyhydrogen blow-pipe spectra, which they describe, the metals, minerals, or precipitates on ashless filter papers are burned in an oxyhydrogen flame, and the spectra photographed in the usual way. Refractory silicates in very fine powder are decomposed by being heated with strong sulphuric acid and ammonium fluoride, which has been purified by distillation in a platinum retort. After complete decomposition of the mineral the sparingly soluble sulphates are separated by filtration, and burnt on the ashless paper. The hydroxides of the heavy metals are precipitated by ammonia and similarly burnt. The alkalies are contained in the aqueous solution, of which the

treatment is varied according to the nature of the substance under examination. For the separation of rubidium and cæsium, platinic chloride is used, and the platini-chlorides collected and burnt.—Pharm. Journ., Dec. 15, 1900, 689; from Proc. Chem. Soc., *16*, 191.

Metallic Salts — Diphenyl-Carbazide a Delicate Reagent.—When a solution of diphenyl-carbazide in benzene is shaken with a neutral or faintly acid solution of salts of copper, or mercury, or of ferric salts, it forms compounds having intense and characteristic colors, which P. Cazeneuve considers may find useful application. The reagent is so sensitive that it will detect these metals in solutions of 1 : 100.000. The reagent is only sparingly soluble in benzene. If the solutions of the metallic salts are stronger than 1 : 1000, an alcoholic solution of the reagent may, with advantage, be substituted for that with benzene. Copper salts give a violet color, which is soluble in benzene, from which it is not removed on agitating with potassium ferrocyanide. Salts of mercury give a pansy blue color, while ferric salts give a peach color, passing to a deep brown. The colors are destroyed by mineral acids, or by a large excess of organic acids. Chromic acid and its salts give, when acidulated with HCl, and shaken with a little powdered diphenyl-carbazide, a magnificent violet color, which is very stable in excess of acids, and is not removed from aqueous solution by benzene, but is soluble in amylic alcohol. It is sensisitive to less than 1 : 1,000,000 of CrO_3. — Pharm. Journ., Oct. 20, 1900, 440; from Comptes rend., *131*, 346.

Crystallization—Method to Overcome Difficulties.—Ruempler recommends the following method for obtaining crystals from difficultly crystallizable bodies soluble in water and slightly soluble in alcohol. Alcohol is slowly added to the aqueous solution until it is slightly turbid; the mixture is then allowed to stand over quicklime. The drying agent only withdraws the water from the solution, when the liquid, gradually becoming richer in alcohol, separates out crystals in the course of weeks; in this manner crystals may be obtained of such substances as peptone and arabic acid. This method might be specially applicable in the investigation of other plant constituents which do not readily crystallize.—Pharm. Journ., April 20, 1901, 485; from Chem. Centralblatt, *72*, 297.

OXYGEN.

Atmospheric Ozone—Method of Determination.—R. A. Hatcher and H. V. Arny communicate the results of some interesting experiments and observations concerning the presence of ozone in the atmosphere, its possible relations to zymotic diseases, and its determination. A review of the literature on the subject proves that the work heretofore done in this direction is very unsatisfactory, and particularly that Schoenbein's test, which unfortunately has been relied on to determine its presence in the air, is entirely unreliable, since it has been shown that carbon dioxide,

a common component of swamp air, is quite able to decompose potassium iodide and liberate iodine, and then give rise to the color reactions supposed to be characteristic of Schoenbein's test (a potassium iodide starch paper) under the influence of ozone. So little has been accomplished in the direction of determining atmospheric ozone by assay, that the authors express the belief that in their present work they may be looked upon as among the pioneers in this field, and while they admit their liability to err, give their results in the hope of leading to further observations not open to the objection to which Schoenbein's test-paper is subject. Two methods of ozone assay were employed by them: Hartley's, in which an arsenite is oxidized to arsenate ($KAsO_2 + O_3 = KAsO_3 + O_2$), and Houzeau's, in which potassium iodide is oxidized to iodate ($KI + 3O_3 = KIO_3 + 3O_2$). From the detailed description of the experiments made the authors appear to be justified in their conclusion that, although the accuracy of the iodide method has been questioned, the two methods are equally reliable and well adapted for the estimation of ozone in the atmosphere.—Amer. Journ. Pharm., Sept., 1900, 423–429.

HYDROGEN.

Water—Quick Method of Determining its Hardness.—Giulio Morpurgo determines the hardness of water by titration with decinormal hydrochloric acid, using methyl orange as indicator. This indicator not being affected by carbon dioxide, the titration will indicate the total carbonates, bicarbonates and hydroxides in solution. To determine the permanent hardness, a portion of the water is treated with a known excess of sodium carbonate. The carbonates of the alkaline earths are thus precipitated, separated by filtration, and the excess of sodium carbonate determined in the filtrate. The excess so found subtracted from the total sodium carbonate added leaves the amount which reacted with the earthy salts and hence indicate the permanent hardness.—Pharm. Rev., Feb., 1901, 75; from Giorn. Farm. Chim., *50*, 420, through Chem. Centralbl., *71*, II, 1186.

Potable Water—Detection of Minute Traces of Lead.—Bellocq finds that water containing minute traces of lead offers to the practiced eye a faint though persistent opalescence which is destroyed by nitric acid—a fact which leads him to the opinion that the toxic metal may be in combination with some organic matter. For its detection in such water, he uses a zincic reagent in which the soda has been replaced by ammonia, the test being made as follows: To 1 or 2 liters of the suspected water 5 to 10 Cc. of ammoniacal zincic reagent (an excess) is added and allowed to remain perfectly quiet for some hours. The clear limpid supernatant liquid is decanted as much as possible; the rest is filtered on a filter of 15 or 18 Cm. diameter, which is rapid, and leaves the precipitate in an easily detachable condition. The precipitate is decomposed with warm acetic acid containing a little ammonium acetate, filtered through a plug of

absorbent cotton into a test-tube, and the clear filtrate touched with a glass rod wetted with solution of potassium chromate. In the presence of lead, a yellow cloudiness appears, and after a time a precipitate of lead chromate is formed.—Chem. News, Jan. 25, 1901, 40; from Journ. Pharm. Chim. (6), xiii, No. 2.

Drinking Water—Quantitative Estimation of Nitrites.—According to Erdmann the presence of nitrites, even in minute traces, may be determined quantitatively with accuracy by the following process: Add 5 Cc. of a hydrochloric acid solution of sulphanilic acid (2 Gm. sodium sulphanilate to the liter) to 50 Cc. of the water, and, after about 10 minutes, 0.5 Gm. of amido-naphthol-disulphonic acid. In the presence of nitrous acid a Bordeaux red color is produced, and fully developed in one hour, the reaction being dependent on the formation of certain mono-azo-coloring bodies. By comparing the color with that produced by nitrite solutions of known strength, the amount of nitrites in the sample may be determined quantitatively.—Schweiz. Wochenschr. f. Pharm. u. Chem., *38*, 187.

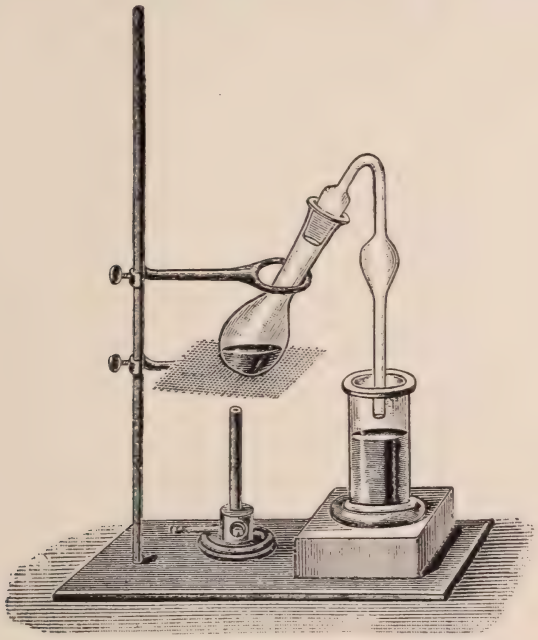
Mineral Waters—Use of Barium Hydrate for the Detection of Organic Matter.—F. Garrigon finds that the property of barium hydrate to precipitate all the metallic oxides contained in a mineral water, enables the detection of a series of organic substances in such waters: (1) Acids forming insoluble barium salts, recognized by the blackening of the barium precipitate on calcination. (2) The substances which barium hydrate leaves or sets free in the water, such as fatty materials and substances behaving as alkaloids; these can be extracted from the water by means of benzene, petroleum ether, and chloroform. (3) An acid which is apparently freed from its compounds by sulphuric acid. (4) Substances which precipitate silver nitrate, in the same manner as the three halogens; these are probably the same as (3). (5) Finally, a neutral substance which remains in the last portions of the primitive liquid with the alkaline earths and the alkalies.—Chem. News, Jan. 25, 1901, 47; from Compt. rend., Dec. 31, 1900.

NITROGEN.

Nitrogen—Improved Apparatus for Kjeldahl's Determination.—To avoid the annoyance occasioned in small laboratories by the escape of sulphurous acid during nitrogen determinations by Kjeldahl's method, Dr. M. Vogtherr provides the combustion flask with a neck-piece of special construction, as shown by Fig. 49. It consists of a wide glass tube, shaped somewhat conically at the end so as to fit into the neck of the flask, narrowed to smaller caliber and bent acutely, the outer limb being the longest and widened to a pear-shaped bulb at about the middle of its length, as shown in the cut. The end of the longer outer limb nearly

touches or is slightly immersed in water, or better, dilute soda solution, during the combustion, thus securing the complete absorption of the gases produced.—Apoth. Ztg., Aug. 4, 1900, 529.

FIG. 49.

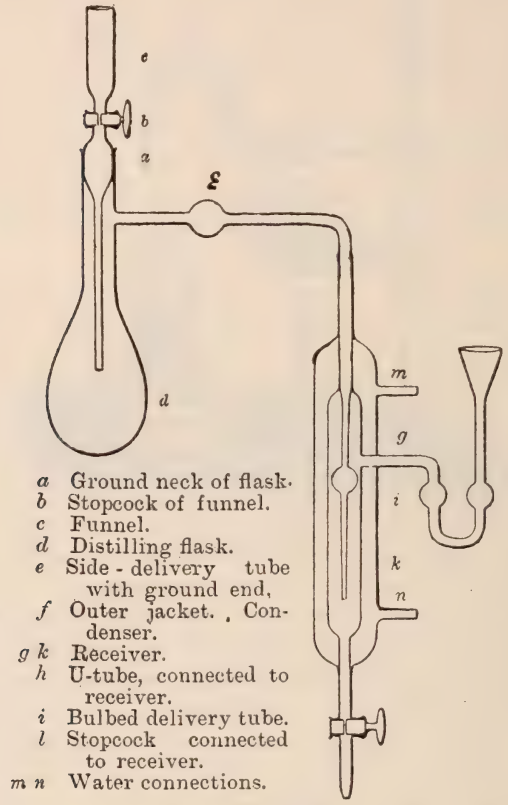


Improved Apparatus for Kjeldahl's Determination.

Nitrogen and Chlorine—New Apparatus for Determination.—J. F. Tocher has devised the apparatus shown in the accompanying cut (Fig. 50), which may be used with equal facility for chlorine determinations and for the estimation of nitrogen by Kjeldahl's method, and possesses a number of advantages over the apparatus usually employed for these purposes. It consists of two parts: (1) A flask, *d*, of about 500 Cc. capacity, of hard glass, which is supplied with a stoppered funnel, *a b c*, and a delivery tube, *e*, the funnel being ground to fit the flask at *a*, while the delivery tube, provided with a central bulb, is ground at the end of the downward bend, so as to fit the extension into the receiver. (2) A receiver, surrounded by a jacket so as to form a condenser and receiver combined. The outer jacket, *f*, has the outlet and inlet tubes, *m* and *n*, for the supply of water. The inner space, *g*, *k*, is the receiver proper, from the upper part of which hangs a bulbed extension of the delivery tube, while the U-shaped funnel tube passes laterally into it through the outer jacket, as shown at *i*, in the diagram, the receiver being also pro-

vided with a stop-cock beneath for the removal of liquid from it. Omitting the detailed explanations of its use, which will suggest themselves to those familiar with the determinations for which the apparatus is intended, the following are the advantages claimed: (1) Loss of chlorine (or ammonia) is entirely prevented by introduction of HCl (or soda) through stoppered funnel. (2) Loss is prevented by having glass connections throughout. (3) The condensing apparatus is also the receiver, and disposes of the

FIG. 50.



a Ground neck of flask.
b Stopcock of funnel.
c Funnel.
d Distilling flask.
e Side-delivery tube with ground end,
f Outer jacket. Condenser.
g k Receiver.
h U-tube, connected to receiver.
i Bulbed delivery tube.
l Stopcock connected to receiver.
m n Water connections.

New Apparatus for Nitrogen and Chlorine Determinations.

U-tubes and connections in the case of chlorine, and of the addition of ammonia-absorption flask to Liebig's condenser, in case of nitrogen. (4) The fluid and washings can be readily run off for titration, and the apparatus is then ready without further work for another operation. (5) In nitrogen estimations the flask can be used with advantage in decomposing the nitrogenous substances prior to distillation, and prevents possible loss in transference.—Trans. Brit. Pharm. Conf., 1900, 526–528.

Iron Nitride—Preparation and Properties.—G. J. Fowler has prepared iron nitride, Fe_2N, by the action of ammonia on finely divided iron, on ferrous chloride or bromide, and on iron amalgam, and finds the method depending on the use of finely divided iron to be the most convenient. The temperatures of its formation in ammonia and of its decomposition in hydrogen are the same. Heated in a current of nitrogen, iron nitride begins to decompose at about 600°; it is slightly magnetic; its specific gravity is 6.35. When oxidized in air or oxygen, only traces of nitrogen oxides are produced; heated in a current of air, the substance begins to be converted into ferric oxide and nitrogen at about 200°. It takes fire in chlorine, either spontaneously, or when slightly warmed, ferric chloride and nitrogen being formed, but no trace of nitrogen chloride. Dilute hydrochloric and sulphuric acids yield the corresponding ferrous and ammonium salts, hydrogen being liberated. Nitric acid acts only slowly on this nitride even when strong, and the products vary with the concentration of the acid. Gaseous hydrochloric acid begins to attack the nitride at 220°, and at 350° the reaction becomes rapid, the substance being completely converted into ferrous chloride and ammonium chloride. Gaseous hydrogen sulphide has a precisely similar action at 200°. Nitric oxide acts similarly to oxygen, and converts the nitride into oxide, the reaction beginning at 120° and becoming rapid at 170°. Carbon dioxide oxidizes the nitride at about 530°. On heating the nitride in steam at 100°, ammonia is very slowly formed. Sodium cyanide is formed when iron nitride is heated with sodium and carbon.— Pharm. Journ., Jan. 5, 1901, 1; from. Proc. Chem. Soc., *16*, 209.

Nitric Acid—Estimation in Natural Waters by Stannous Chlorides.—H. Henriett observes that an acid solution of stannous chloride is known to transform nitric acid into hydroxylamine if the stannous chloride is present in excess and if there is enough water present to prevent the hydrochloric and nitric acids from reacting upon one another. He has investigated this reaction with the object in view of determining its utility for the estimation of nitrates in water, and finds that, at the boiling point, the nitric acid is transformed quantitatively into hydroxylamine, the reaction apparently taking place according to the following equation: $3SnCl_2 + NO_3K + 8HCl = 3SnCl_4 + NH_2OHHCl + KCl + 2H_2O$. The reaction can be used for the estimation of nitrates, if an iodine solution is used for the estimation of the stannous chloride—$SnCl_2 + 2I + 3HCl = SnCl_4 + 2HI$. From these equations, it will be seen that six atoms of iodine correspond to one atom of nitrogen.—Chem. News, May 17, 1901, 239; from Compt. rend., April 22, 1901.

Nitric Acid—Production from Atmospheric Nitrogen.—M. L. Wilbert calls attention to the economical production of nitrates from atmospheric nitrogen as one of the immediate possibilities of the future. From data

furnished by Lord Rayleigh's experiments made to effect the combustion of the nitrogen in atmospheric air for the purpose of separating argon, Sir William Crookes, in the presidential address before the British Association for the advancement of Science, in 1898, gives some interesting figures connected with the problem of producing nitrates artificially. He estimates that at the present price of coal, with a possible conversion of 10 per cent. of its available energy into electricity, sodium nitrate might be produced at $130.00 per ton; but if the initial cost of the electric current could be cut down to one-fifth, as at Niagara Falls, the cost of electric sodium nitrate would be reduced to $26.00 per ton, a sum below that at which native nitrate ($37.50) is quoted, and offering a fair margin of profit. Mr. Wilbert, however, considers it possible to improve even on these favorable figures. Within a year or two, another source of energy has been suggested that seems destined to play an important part in mechanical and industrial development. This source of energy is derived from the conversion of blast furnace gases into power by means of a new style gas engine that has been introduced at some of the larger blast furnaces in Europe. The power generated from this source would necessarily be more or less irregular, and available therefore with advantage only for the manufacture of some by-product—than which none seems to offer greater inducements than the cheap production of nitrates, so largely used as fertilizers.—Amer. Journ. Pharm., April, 1901, 171–173.

ARGON, KRYPTON, ETC.

Argon and its Companions—Physical Properties.—Wm. Ramsay and Morris W. Travers briefly review the conditions that led to the discovery of the companions of argon—helium, neon, krypton, and xenon. They have now determined the physical constants of all of these elements, mentioning the methods by which they were obtained in a state of purity. They mention also in this connection that the gas which they imagined that they had discovered some years ago, and which they had named "metargon," has no existence as an individual element, the peculiarities of its spectrum being attributable to the presence of some carbon compound. The following table exhibits the physical properties of the different elements mentioned, as determined in their present study:

	Helium.	Neon.	Argon.	Krypton.	Xenon.
Refractivities (Air = 1)	0.1238	0.2345	0.968	1.449	2.364
Densities of gases (O = 16)	1.98	9.97	19.96	40.88	64.
Boiling points at 760 Mm	?	?	86.9° abs.	121.33° abs.	163.9 abs.
Critical temperatures	?	Below 68° abs.	155.6° abs.	210.5° abs.	287.7° abs.
Critical pressures	?	?	40.2 metres.	41.24 metres.	43.5 meters.
Vapor-pressure ratio	?	?	0.0350	0.0467	0.0675
Weight of 1 Cc. of liquid	?	?	1.212 Gm.	2.155 Gm.	3.52 Gm.
Molecular volumes	?	?	32.92	37.84	36.40

That these gases are all monatomic has been proven by determinations

of the ratio of their specific heats by Kundt's method; that they form a series in the periodic table, between that of fluorine and that of sodium, is proven by three lines of argument made by the authors; but the hopes entertained by them that the simple nature of the molecules of the inactive gases might throw some light on the puzzling incongruities of the periodic table has been disappointed. The authors have not been able to predict accurately any one of the properties of one of these gases from a knowledge of those of the others; an approximate guess is all that can be made. The conundrum of the periodic table has yet to be solved.—Chem. News, Nov. 20, 1900, 257.

Krypton—Successful Preparation in a State of Nearly Absolute Purity.—In continuation of previous experiments (see Proceedings, 1900, 673), Prof. A. Ladenburg and Dr. C. Krügel have endeavored to find a better and shorter method of preparing krypton. While they have failed in this they have succeeded to obtain krypton in a nearly absolutely pure condition, the difficulties of its preparation being augmented by its great scarcity in the air. The krypton obtained by a fractionation method explained is free from both nitrogen and oxygen, or contains but traces of these. Probably the product may contain "xenon," but the observed density of krypton would thus be too high. This density relatively to oxygen = 32, or the molecular weight calculated from the data obtained is 59.01, a result which is in agreement with the numbers 58.81 and 58.67 previously found. The authors consider that their hypothesis as to the position of krypton in the periodic system is undoubtedly confirmed by their present research.—Chem. News, Nov. 2, 1900, 209.

HALOGENS.

Liquid Halogens—Specific Gravities at Their Boiling Points.—J. Dingman and W. Ramsay have determined the specific gravities of the following halogens at their respective boiling points with atmospheric pressure:

Iodine, boiling at 184.5°, has the sp. gr. 3.706.

Chlorine, boiling at —55.6°, has the sp. gr. 1.507.

Fluorine, boiling at —187°, has the sp. gr. 1.108.

The authors also determined the specific gravities of

Liquid Oxygen and Liquid Nitrogen to be 1.315 and 0.7914 at their respective boiling points. — Pharm. Journ., Nov. 24, 1900, 571; from Proc. Chem. Soc. *16*, 172.

Halogen Salts of the Alkalies—Necessity of Revision of the Solubilities given in the B. P.—Henry G. Greenish communicates a paper in which he gives the details of experiments made for the purpose of confirming the accuracy of the B. P. statements respecting the solubility of the halogen salts of ammonium, potassium and sodium, or of correcting these if found inaccurate. The results are shown in the following table in comparison with the official statement:

	Found.	Official Statement.
Ammonii Bromidum, water	1 in 1.40	Readily soluble.
Ammonii Bromidum, alcohol	1 in 12.83	Less soluble.
Ammonii Chloridum, water	1 in 2.80	1 in 3.
Ammonii Chloridum, alcohol	1 in 55	1 in 60.
Potassii Bromidum, water	1 in 1.59	1 in 2.
Potassii Bromidum, alcohol	1 in 108.7	1 in 200.
Potassii Iodidum, water	1 in 0.71	Less than its weight.
Potassii Iodidum, alcohol	1 in 11.32	1 in 12.
Sodii Bromidum, water	1 in 1.126	1 in less than 2.
Sodii Bromidum, alcohol	1 in 13.57	1 in 16.
Sodii Iodidum, water	1 in 0.58	1 in less than its weight.
Sodii Iodidum, alcohol	1 in 2.15	1 in 3.
Sodii Chloridum, water	1 in 2.8	1 in less than 3.

Reviewing these results, the author expresses the opinion that the official statements of the solubilities of these salts undoubtedly need revision. Such indications as "readily," "less readily" soluble, etc., should be replaced by definite figures. In all the cases examined the solubilities given in the B. P. are below the truth, although they are not all equally below the truth. With one exception, namely potassium iodide, the value of the solubility of these salts in alcohol is very doubtful, and in the case of potassium iodide only in reference to its use in making tincture of iodine. (B. P.—Rep.)—Pharm. Journ., Aug. 11, 1900, 190–195.

Chlorates and Bromates—Detection by Means of Strychnine.—Fages employs a solution of 0.18 Gm. of strychnine in 24 Cc. of nitric acid (sp. gr. 1.334) for the detection of bromates and chlorates. The reagent is simply added to the solid salt or to its solution, the only precaution necessary being that the strychnine shall be in excess; an excess of the chlorate vitiates the result. A convenient quantity to operate with is 1 Cc. of the reagent and 1 or 2 drops of the aqueous solution of the salt. Under these conditions chlorates and bromates give an intense red color. Hypochlorites, chlorine, and hydrochloric acid prevent the development of the color, or discharge it when already formed, so also does a large excess of ferric chloride, but other chlorides do not interfere, except when present in quantity. The reaction is not given by nitrates, perchlorates, iodates, or permanganates. Nitrites hinder the reaction unless the solution containing them has been previously treated with nitric acid. The red color is not soluble in immiscible solvents such as ether, chloroform, carbon disulphide and benzene.—Pharm. Journ., Feb. 23, 1901, 191; from Annales de Chim. Analyt., 5, 441.

Non-Hydrated Perchloric Acid—Preparation and Properties.—D. Vorlaender and R. V. Schilling find that the method recommended by Roscoe for the preparation of non hydrated perchloric acid gives only a small return, and give the details of a modification of the method which they

have used with advantage, and which consists in distilling the mixture of H_2SO_4 and $KClO_4$ in vacuo. A mixture of 50 grms. of powdered $KClO_4$ and from 150 to 175 grms. of H_2SO_4 at 96 to 97.5 per cent. is heated on the oil-bath in a fractionating flask. Between the pump and the receiver (cooled by a mixture of ice and salt), is placed a tube containing soda-lime; the joints are made with asbestos and water-glass. At a pressure of 50 to 70 Mm. anhydrous perchloric acid passes over at 135–145°. The temperature of the oil-bath is raised successively to 155–160° and to 180–196°. The vapor of $HClO_4$ in vacuo will stand a temperature without decomposition much higher than that given by Roscoe at the normal pressure, viz., 92°. The distilled acid, which is colored yellow by a little ClO_2, and containing about 1 per cent. of H_2SO_4, is immediately afterwards rectified on the water-bath at a pressure of 50–70 Mm., the temperature of the bath being 45–65°; the $HClO_4$ is then collected pure and colorless. It boils at 30° at a pressure of 56 Mm., its density at 22° is 1.764. It does not become solid in a mixture of solid CO_2 and ether. It is insoluble in CCl_4, but dissolves in $CHCl_3$, and this solution takes a red color in the air, giving crystals of the monohydrate. When kept in sealed flasks it gradually becomes yellow, and then brown, and, finally, decomposes with a violent explosion. When mixed with its own volume of benzene it forms a green emulsion, and then explodes. It also explodes when mixed with phosphoric acid. The stability of $HClO_4$ partly depends on the concentration of the sulphuric acid used in its preparation. The stability increases as the strength of the acid decreases. The use of 98 per cent. H_2SO_4 may be dangerous, but with acid at 92–93 per cent. perchloric hydrate may distil over and solidify in the tube, blocking it up. Even with a large excess of H_2SO_4 some perchloric acid remains in the flask, as the presence of $KHSO_4$ interferes with the complete decomposition of the $KClO_4$. Phosphoric acid and pyrophosphoric acid do not decompose $KClO_4$.—Chem. News, April 4, 1901, 167; from Lieb. Ann., vol. cccx, 369.

Potassium Bromide—B. P. Test for Thiocyanates.—F. A. Upsher Smith points out that the B. P. test for sulphocyanates in potassium bromide—"Test solution of ferric chloride should not cause a red coloration in the cold aqueous solution"—will not hold good unless the amount of ferric chloride be restricted. He suggests that the B. P. test be modified accordingly, as follows: "0.5 Gm. of the salt dissolved in 10 Cc. of water should give a yellow and not a red or reddish-brown coloration on the addition of 2 drops of test solution of ferric chloride (absence of more than 0.01 per cent. of ammonium thiocyanate)."—Pharm. Journ., April 13, 1901, 460.

Potassium Iodide—New Volumetric Method of Determination.—Thos. S. Barrie has developed a process for the volumetric determination of potassium iodide which is available in the presence of chlorides and

bromides, and preferable on this account over the methods in which silver nitrate is employed. It is based upon the fact that when a mixture of the potassium salts of the three haloids is dissolved in water and treated with a 5 per cent. solution of potassium dichromate and a 10 per cent. solution of sulphuric acid, iodine, and iodine only, is liberated. The iodine is extracted with an immiscible solvent, carbon disulphide or toluene, which is titrated with decinormal thiosulphate solution, and from the iodine found, the potassium iodide is calculated.

The analytical process requires the following solutions:

1. Decinormal thiosulphate solution.

2. Iodine solution (decinormal or otherwise), whose strength relative to the thiosulphate solution is known exactly.

3. Potassium dichromate in 5 per cent. aqueous solution.

4. Sulphuric acid in 10 per cent. aqueous solution.

Weigh out about 0.5 Gm. potassium iodide, dissolve in 20 Cc. water contained in a stoppered separator, add 10 Cc. each of dichromate and acid, allow to stand three or four minutes, then add 60 Cc. toluene and shake vigorously. When the mixture has separated, run off the lower yellow acid stratum and wash the toluene by agitation with various small quantities of water, adding washings to the first separate. The mixed washings are treated with more toluene in another separator, and if the toluene be colored violet, it is, after washing, added to the toluene previously separated. The colored toluene is then shaken out with about 35 Cc. thio. solution; the thio. is run off, the toluene washed to free from adherent thio. solution and washings added to first separate. The separated thio. is now titrated with iodine solution to determine the excess of thiosulphate, which is deducted from the volume taken. As 16.473 Gm. potassium iodide equal 1,000 Cc. $\frac{N}{10}$ thio. solution, the percentage of iodide in the sample can easily be calculated.—Pharm. Journ., July 21, 1900, 58.

Iodic Acid—Improved Mode of Preparation.—A. Scott and W. Arbuckle observe that the usual method of preparing iodic acid by gently boiling iodine with nitric acid in a flask with a long neck, is tedious when any quantity is required, and liable to great loss of iodine unless the source of heat is very carefully regulated. By using, first the ordinary form, and later a modified form, of Soxhlet's fat extraction apparatus to contain the iodine, almost theoretical yields of iodic acid were obtained after a very short treatment with the boiling nitric acid. The liability, however, of the siphon tube to become choked with crystals of iodic acid led to the abandonment of this type of apparatus. After many trials with various forms of apparatus, the authors recommend the use of a round-bottomed flask having a ground-in neck carrying two tubes, to one of which is sealed a reflux condenser, and through the other is fitted a tube by means of which a current of oxygen is passed through the boiling liquid. With this apparatus *finely powdered* iodine boiled with ten times its weight of fuming

nitric acid may be completely oxidized in 20–30 minutes.—Pharm. Journ., Feb. 2, 1901, 110; from Proc. Chem. Soc., Jan. 17, 1901.

Iodic Acid—Various Therapeutic Uses.—It is stated in "E. Merck's Ann. Rep.," for 1900, that iodic acid is employed in ophthalmic operations, in the form of soft and hard rods, 1 to 3 per cent. solutions, or 1.5 per cent. ointment. The soft rods are prepared by making a plastic mass with pure iodic acid and water; the hard rods are prepared from a mass containing 15 parts of iodic acid and 1 part of gum acacia. As a substitute for the serum treatment of diptheric angina, not complicated by croup, a mixture of iodic acid and milk sugar (1 to 10) is introduced into the throat by means of a powder insufflator, half an hour after the application of a 3 per cent. solution of hydrogen peroxide by means of a spray atomizer. The lips should be protected by a thin layer of vaselin and, in the interval between spraying and insufflating, the patient should use a gargle consisting of iodic acid, 0.5; distilled water, 400.0; glycerin, 25.

Sodium Iodate is injected subcutaneously in cases of acute and chronic articular rheumatism. A fresh 5 per cent. solution is used, 1 or 2 Cc. being injected at one operation, in the vicinity of the seat of pain.—Pharm. Journ., May 25, 1901, 666.

Calcium Iodate — Preparation and Uses as an Antiseptic. — Dr. W. Mackie prepares calcium iodate by adding chlorinated lime solution to an aqueous solution of iodine in potassium iodide in which the quantity of iodine is such that the solution just transmits light through a depth of three inches. The mixtures being stirred occasionally, a white crystalline precipitate forms after a time. If this is not perfectly white, more potassium iodide solution must be added, the stirring repeated, and then more chlorinated lime solution to complete decolorization. A small quantity of very dilute hydrochloric acid is then added to dissolve any calcium carbonate found, the precipitate is collected on a filter, washed once or twice with cold water, and then dried at not exceeding 100° C. The product contains six molecules of water. The author applies the name

"*Calcinol*" to this compound, and recommends it as a substitute for iodoform, to which it appears to conform closely in its action. The compound is somewhat unstable, and its antiseptic action appears to be due to the slow liberation of iodine and oxygen on contact of the iodate with putrescible organic matter. Calcium iodate is tasteless and odorless, though a slight odor of iodine is developed after keeping it for some time. It is soluble in 380 parts of water at 11.5° C., and solutions of that strength have considerable antiseptic power. It may be used with advantage, also, as a gastro-intestinal antiseptic, and should for intestinal purposes be given in solution. Two-grain doses have been given thrice daily, without inconvenience.—Pharm. Journ., Jan. 12, 1901, 279, from Lancet No. *4,035*, 1867.

Sulphuretted Hydrogen—Construction of a Simple Apparatus.—E. G. Martin describes a simple apparatus for generating hydrogen sulphide at will. It consists of two wide-mouth bottles, one of which is elevated above the other. The upper one is fitted with a rubber cork, bored with two holes, through which pass a small piece of glass tubing and the shorter leg of a glass siphon tube. The lower bottle is also fitted with a rubber cork, through which passes a bent delivery tube fitted with a pinch-cock, and the longer leg of the syphon tube. The tube reaches to the bottom of both bottles and conveys the acid, which is forced back by the gas into the upper bottle when the pinch-cock is closed. The iron sulphide is contained in a test tube, the bottom of which has been knocked out; a constriction should also be made about half an inch up the test tube by heating the glass and nipping with warm crucible tongs, so that a narrow slit results. The short glass tube pressing through the cork of the upper bottle serves to maintain communication with the atmosphere so that pressure in the bottle is avoided. It may be closed with a rubber cap, when the apparatus is not in use, after the acid has been displaced by the gas, so that the surface of the liquid in the lower bottle is level with the constriction in the test tube containing the sulphide. The apparatus is entirely free from odor when closed, although it contains a supply of gas ready for use.—Pharm. Journ., Febr. 23, 1901, 213.

Sulphammonium—A New Compound.—By the action of sulphur on liquefied ammonia, Henry Moissan has obtained a new compound—sulphammonium. This substance has a dark red color, and is completely dissociable at ordinary temperatures and pressure. It has the property of giving up its sulphur easily in the cold to a great number of simple and compound bodies.—Chem. News, March 29, 1901, 154; from Compt. rend., March 4, 1901.

Sulph-Ammonium—Formation and Characters.—Henri Moissan has previously shown that liquefied ammonia forms with sulphur a compound having a deep purple color. Further investigation has yielded several interesting results. It is found that the temperature at which the three allotropic forms of sulphur give this body are not identical. Neither gives any color in liquefied ammonia, in sealed tubes, at —80° C. At —38° C. insoluble sulphur forms the characteristic purple solution, prismatic sulphur at —15.5°, and octahedral sulphur at —11.5° C. The purple substance is a true compound and not a mere solution. It does not throw out any sulphur on cooling, and solidifies 4° or 5° below the congealing point of ammonia. The octahedral form of sulphur is absolutely insoluble in liquefied ammonia between the temperatures —75° and —15.5°, and the purple liquid is stable in sealed tubes up to 90° C.; above that temperature it gradually loses color, and sulphur is deposited on the sides of the tube until at 150° C. only fused globules of sulphur are visible. On cooling, when the meniscus of liquid reappears, it is at first quite colorless, and the

fused sulphur is perfectly immiscible in it; as the temperature falls to 100° a violet tint reappears, which increases on further cooling. By cooling to —40° C. a solution of sulphammonium, under a pressure of forty atmospheres in a Cailletet tube, it may be obtained in a crystalline condition in the form of small ruby-red crystals, soluble in excess of liquefied ammonia in alcohol, and in many other solvents. The chemical constitution of sulphammonium has yet to be definitely determined. Results so far obtained indicate that between 0° and — 20° the composition of the body is probably $(NH_3)_2S.2NH_3$, while at —23° it is represented by the formula $(NH_3)_2SNH_3$.—Pharm. Journ., April 6, 1901, 423; from Comptes rend., *132*, 510.

Sulphuryl Fluoride (SO_2F_2)—Preparation and Properties.—H. Moissan and T. Lebeau have been able to effect the steady combination of fluorine and sulphurous acid, and to avoid the explosive reactions which take place under ordinary conditions, by slowly passing fluorine into a vessel containing SO_2 through a tube having at its further extremity a platinum wire kept incandescent by a gentle electric current. The fluorine burns in SO_2 with a steady flame, among the products being the new gas SO_2F_2. After purification, this is liquefied at —86° C., and finally distilled, the portion boiling constantly at —52° C. being sulphuryl fluoride. The gas is also formed with several other gaseous compounds by passing fluorine into an atmosphere of moist H_2S. In this case the fluorine burns quietly, and the incandescent platinum is not necessary. SO_2F_2 is a colorless, odorless gas, boiling at about —52° C., and melting at 120° C. It is without action on water, even in a sealed tube; its solubility in that liquid being about 1 : 10. Heated in glass it is without action below a dull red heat; above that temperature the glass is slowly acted on, becoming more affected as the temperature rises. Oxygen is without action on it below a red heat; and the passage of induction sparks through a mixture only gives rise to the slightest combination of the two gases. Sodium may be melted in it with reaction, but at a higher temperature a total absorption takes place. Calcium burns in the gas when heated, iron is without action. Gaseous ammonia unites, but slowly with SO_2F_2, forming a white solid body, $SO_2F_2.5NH_3$.—Pharm. Journ., Mar. 16, 1901, 323; from Comptes rend., *132*, 374.

Hyposulphite—Standardization of its Volumetric Solution.—Perrin calls attention to the inconvenience and possible inaccuracy of standardizing hyposulphite solutions with iodine and recommends as a more practical method their standardization with the use of pure exactly neutral potassium iodide, potassium iodate and volumetric solution of sulphuric acid. These react according to the equation: $5KI + IO_3K + 3SO_4H_2 = 3SO_4K_2 + 3H_2O + I_6$, so that 49 SO_4H_2 correspond to 127 of iodine. If, for instance, $\frac{N}{20}$ solution of hyposulphite is to be made, about 2 Gm. of *accurately neutralized* potassium iodide, 50 Cc. of water and a pinch of potas-

sium iodate are placed in a 250 Cc. flask, and 10 Cc. of an exactly decinormal solution of sulphuric is added. After a few moments the hyposulphite solution to be titrated is added, drop by drop, until all the liberated iodine is transformed, the end reaction being determined in the usual way, by using mucilage of starch. Simple calculation on the quantity of hyposulphite solution consumed then enables the dilution of the latter to the proper volume corresponding to the desired standard—$\frac{N}{10}$, $\frac{N}{20}$, etc. If an alkaline volumetric solution is desired, a portion of the water necessary for dilution is substituted by the necessary quantity of alkaline solution.—Chem. News, May 3, 1901, 207; from Mon. Scient., April, 1901, 244.

Neutral Sodium Hydrosulphite—Preparation of the Pure Salt and of a Solution Suitable for Reducing Indigo.—A. Bernthsen and M. Bazlen have succeeded in preparing the neutral hydrosulphite of sodium in a state of purity by treating powdered zinc with monosodic sulphite and immediately adding sulphurous acid in the proportion shown by the following equation: $2SO_3NaH + SO_2 + Zn = S_2O_4Na_2 + SO_3Zn + H_2O$. Milk of lime is then added in slight excess, and the solution filtered. This filtrate contains only hydrosulphite of sodium. In this manner commercial solutions of this salt can be prepared at 15–16° B., of which 5 kilos. will suffice to reduce 5 kilos. of indigo. If such solutions are treated with sea-salt the hydrosulphite is precipitated in the pure state, in the form of crystals; the same will occur even if we add NaCl to the warm liquid and allow to cool. NaHO may also be used instead of NaCl. The analysis of the salt leads to the formula $S_2O_4Na_2 + 2H_2O$. It occurs in thin prisms with a vitreous lustre, 15 Mm. in length, easily oxidizable in moist air, but lasting for days without change in dry air, and fairly stable in dry air in a closed vessel. The dried salt burns at a dull red heat with a blue flame, and gives off SO_2.

Zinc Hydrosulphite, S_2O_4Zn, has recently also been obtained, by Nagel, in the solid state, by the action of sulphurous acid on granulated zinc in alcohol.—Chem. News, Nov. 9, 1900, 231; from Berichte, *33*, 126.

Persulphates—Uses of the Ammonium and Sodium Salts.—Attention is called in "E. Merck's Annual Report," for 1900, to the use of

Ammonium Persulphate to demonstrate the presence of indican in urine. On adding a crystal of this persulphate, together with 5 Cc. of 25 per cent. hydrochloric acid, to 10 Cc. of the urine, and then adding chloroform, the latter is colored blue if indican is present.

Sodium Persulphate finds medicinal application as an aperient and eupeptic in cases of incipient tuberculosis and in convalescence from acute diseases, where great difficulty is experienced in restoring the normal digestive capacity. One tablespoontul of an aqueous solution of 1 p. in 75 p. should be taken in a tumblerful of water one hour before dinner.

A solution of this strength is known in France under the name of "Persodine."—Pharm. Ztg., May 25, 1901, 665–667.

SELENIUM.

Selenium.—Probable Cause of Toxic Action of *Beer*, which see under "Organic Chemistry."

Selenium—Detection in Commercial Sulphuric Acid.—A. Jouve states that traces of selenium are almost invariably found in commercial sulphuric acid, even the so-called pure acid containing the impurity. He finds that acetylene is a very delicate reagent for its detection, the passage of that gas through the acid giving a red color reaction in the presence of one-part of selenium in 100,000. It is thus much more delicate than the codeine color reaction, or the method of reduction by means of sulphurous acid. The reaction appears more rapidly if the acetylene contains a little vapor of hydrochloric acid.—Pharm. Journ., June 22, 1901, 773; from Bull. Soc. Chim. [3], *25*, 489.

Selenium—Influence on Certain Tests for Arsenic.—In view of the fact that the presence of selenium compounds has recently been demonstrated in brewing sugar and in two samples of beer (see *Beer*, under "Organic Chemistry"), O. Rosenheim has investigated the possible influence of selenium on the detection and quantitative determination of arsenic in beers. He finds that Marsh's test will give no indication of selenium in the presence of arsenic, and that the magnitude of the arsenical mirror is influenced by the selenium; this is due to the formation of the compound As_2Se_3 in the generating flask. Under certain conditions the formation of the arsenical deposit is completely inhibited. Reinsch's test is applicable to the detection of selenium, and, if modified, to the separation of that metal from arsenic. This modification consists in the substitution of a polished silver foil, suspended by a silver wire, for the copper foil generally employed. Selenium is deposited practically free from arsenic. This, when sublimed in the usual way, gives a deposit of selenous acid, which may be obtained in characteristic fern-leaf crystals by drying over sulphuric acid the tube containing the sublimate. Owing to its extremely hygroscopic nature, selenous acid, when first sublimed, is apt to assume the form of droplets, and thus be overlooked unless the tube be dried. Arsenic may be obtained from the liquid, after the removal of the selenium, by continuing the test, with copper foil, in the usual manner. The presence of selenium, furthermore, interferes with the application of Gutzeit's, Bettendorf's, and the electrolytic tests for arsenic. The author is now engaged, with Dr. Tunnicliffe, in working out a special method for the quantitative estimation of selenium in sugar and beer.—Chem. News, June 14, 1901, 277–280.

Selenium—Compounds with Cobalt.—Fonzes-Diacon has obtained four selenides of cobalt, $CoSe_2$, Co_2Se_3, Co_3Se_4, and CoSe, and by reducing the

above with hydrogen at a high temperature, the subselenide Co_2Se. The first four are obtained by the action of hydrogen selenide on cobalt oxide or the anhydrous chlorate or chloride, at various degrees of temperature and for different periods. Co_3Se_4 is the only one which appears to have been obtained in definite crystalline form; it occurs as a mass of brilliant, greyish-violet crystals, consisting of minute cubical octahedra. By reduction with hydrogen at various temperatures, cobalt selenate is reduced to several oxy-selenides of the metal, or to mixtures of metallic cobalt and selenides.—Pharm. Journ., Dec. 8, 1900, 647; from Comptes rend., *131*, 704.

Copper Selenides—Preparation and Characters.— H. Fonzes-Diacon has recently prepared the two selenides of copper, CuSe and Cu_2Se, in a crystalline condition by new methods, distinct from those originally employed by Berzelius, who first prepared them. He obtains cupric selenide by the action of H_2Se on $CuCl_2$; if this takes place at about 200° C., the crystalline form of the $CuCl_2$ is retained; the resulting CuSe forms long prismatic, bluish-black needles, which melt at a higher temperature. Cu_2Se is obtained as a deep olive-green precipitate by passing H_2Se through an aqueous solution of cuprous chloride. It is obtained in a crystalline state by passing a mixture of hydrogen and H_2Se over anhydrous $CuCl_2$ or over Cu_2Cl_2 heated to redness. It occurs in shining octahedra of a fine dark green color. The same form is obtained by the reduction of the prismatic crystals of cupric selenide, above-mentioned, by the action of heat. Each long crystal of the cupric compound is then transformed into a string of minute octahedra of cuprous selenide. The reduction of cupric selenide by hydrogen at high temperatures, and also of a mixture of that salt with charcoal in the electric furnace, yielded only metallic copper. By heating the latter mixture in a Perrot furnace, however, a crop of brilliant crystals of Cu_2Se was obtained, as cubes, octahedra, and double tetrahedra.—Pharm. Journ., Jan. 19, 1901, 53; from Comptes rend., *131*, 1206.

Selenides of Iron—Characters.— Fonzes-Diacon has prepared five selenides of iron, $FeSe_2$, Fe_2Se_3, Fe_3Se_4, Fe_7Se_8, and FeSe. Ferric selenide, Fe_2Se_3, is obtained by the action of H_2Se on Fe_2O_3. Heated to redness, it forms a greyish powder of crystalline aspect. Ferric chloride or ferric oxide heated in the same gas to a white heat, gives the compounds Fe_3Se_4 or Fe_7Se_8 according to the temperature. The diselenide, $FeSe_2$, is obtained by the action of H_2Se, diluted with nitrogen on $FeCl_2$ in a tube heated to redness; the $FeCl_2$ partly volatilizes and condenses in scales in the cooler parts of the tube; the crystals are transformed into the diselenide without change of crystalline form. The subselenide of iron, Fe_2Se, is not formed, as in the case of the selenides of nickel and cobalt, when ferrous selenide is heated in a current of hydrogen, only a fused mass of iron and of FeSe is produced. Ferrous selenide, FeSe, is obtained

by the action of vapor of Se or H_2Se diluted with nitrogen on metallic Fe heated to redness. The resulting mixture of FeSe and metallic Se is then heated in a current of H, which removes the latter without affecting the ferrous selenide.—Pharm. Journ., Aug. 4, 1900, 161; from Comptes rend., *130*, 1708.

Sodium Selenate, Na_2SeO_3, and

Sodium Tellurate, Na_2TeO_3—*Value in Bacterological Investigations.*—Scheurlen and A. Klett have employed the sodium salts of selenic and of telluric acid, in place of the coloring matters heretofore employed for the purpose of demonstrating the reducing properties of bacteria. They find that when employed in form of 2 per cent. solutions, the selenate is decomposed during bacterial growth under deposition of a red precipitate of selenium, the tellurate depositing a black precipitate of metallic tellurium under the same conditions. Sodium selenate is a white powder, easily soluble in water, while the tellurium salt, also white, is sparingly soluble.—Pharm. Ztg., Mar. 6, 1901, 196; from E. Merck's Ann. Rep. for 1900.

PHOSPHORUS.

Phosphorus—Conversion into Arsenic and Antimony.—In a rejoinder to the criticism of Cl. Winkler concerning the conversion of phosphorus into arsenic (see Proceedings, 1900), F. Fittica attributes the failure of Winkler to secure the conversion to a modification of the method by which he had obtained the arsenic, inasmuch as Winkler had added amorphous phosphorus into melting ammonium nitrate. It is a well known fact that phosphorus enters into complete combustion in the vapor of nitrous oxide (melting ammonium nitrate) just as it is in a current of pure oxygen. Fittica's further experiments, which are not yet completed, moreover point out that antimony is like arsenic a compound of phosphorus with nitrogen and oxygen, and apparently with nitrous oxide. Under conditions which he describes he has obtained antimony in distinctly determinable quantities, while arsenic was produced under these conditions only in traces or not at all.—Apoth. Ztg., July 7, 1900, 462; from Chem. Ztg., 1900, 561.

Phosphorus Sub-Oxides—Existence of a Single One Only.—A. Michaelis and M. Pitzch describe and give a detailed history of seven sub-oxides, the existence of which would appear to be established by the formulas and descriptions given by different authors, viz., P_3O, Pelouze; P_4O, LeVerier; P_4OH, Gautier; P_5H_3O, Gautier; $P_{13}H_3O_3$, Gautier; $P_4H(OH)$, Franke, and P_2O, Besson. The authors have taken up the analysis of these different compounds and find that when freed from mixed amorphous phosphorus and hydride of phosphorus, as well as the elimination of ordinary phosphorus, the seven sub-oxides are reduced to a single one, that of LeVerier, P_4O. The authors have obtained this phosphorus sub-oxide by

two different methods, which they describe, that of LeVerier being a complicated one. They find

Phosphorus Sub-Oxide, P_4O, to be a fine powder, orange-red or yellow in color, according to the state of division, and having the sp. gr. 1.9123 at 26°. It attracts moisture, and gives off the odor of hydrogen phosphide; when moist it ignites at 90°, but when dry it can be heated to a much higher temperature.—Chem. News, Oct. 19, 1900, 195; from Liebig's Annal., cccx, 45.

Phosphorous Acid—Volumetric Estimation.—O. Kuehling states that the oxidation of phosphorous acid in aqueous solution by heating with potassium permanganate, with or without sulphuric acid, is accompanied by separation of manganese dioxide. In presence of relatively large quantities of sulphuric acid the reaction does not occur quantitatively according to the reaction of $3H_3PO_3 + 2KMnO_4 = 3H_3PO_4 + 2MnO_2 + K_2O$, while if little sulphuric acid is present, the manganese dioxide does not separate readily. The author ascribed this difficulty to the formation of potassium hydroxide, and found that when zinc sulphate was added to the mixture, this reacting with the potassium hydroxide to form zinc hydroxide and potassium sulphate, the manganese dioxide mixed with zinc hydroxide separated out very nicely. The following method of procedure was satisfactory: 20 to 40 Cc. of the solution containing from 0.070 to 0.320 Gm. phosphorous acid is measured into an Erlenmeyer flask of about 250 Cc. capacity, 20 to 40 Cc. of a ten per cent. solution of zinc sulphate added, and then a moderate excess of potassium permanganate added, and the mixture heated on a water-bath for one and one-half hour (the red color of permanganate must remain permanent, else more must be added). When the oxidation is complete, the mixture is cooled, an equal volume of cold water added, the precipitate well washed and transferred to a filter. Finally, precipitate and filter and treat with a solution of potassium iodide and dilute sulphuric acid, and the liberated iodine is then determined with thiosulphate in the usual manner. — Pharm. Rev., Febr., 1901; from Berichte., *33*, 2914.

Sodium Phosphate — Temperatures of Conversion into Anhydrous Salt and into Pyrophosphate. — T. C. Whilock and C. F. Barfield have determined the conditions under which sodium phosphate loses its water of crystallization. At a temperature below 220° C., the salt becomes anhydrous, thus at 180° it loses all water within one hour. Above 223° the change to pyrophosphate begins. At 300° the change to pyrophosphate is complete in an hour; at a dull red heat the reaction goes on still more rapidly. — Pharm. Rev., Febr., 1901, 75; from Journ. Amer. Chem. Soc., *22*, 214.

Sodium Phosphate—Examination of American Samples for Arsenic.—Referring to the recent observations concerning the presence of arsenic in

sodium phosphate, in England, E. H. Gane calls attention to available tests—both qualitative and quantitative—for detecting and estimating it when present, and records his experience with fifteen samples of sodium phosphate, representing the output of the principal American manufacturers. Of these samples three were the ordinary crystalline salt, four were "granulated" salt for prescription work, and eight were the popular "effervescent" variety. Of the eight latter samples six contained arsenic, but in no case more than 1 grain, calculated as arsenous oxide, to the pound. This would correspond to about 2 grains to the pound of crystalline sodium phosphate. Curiously enough, two of the most popular brands of effervescent sodium phosphate contained the largest amounts of arsenic. Of the granulated salt two contained "traces" only, and the other two samples were free from arsenic. All three samples of the ordinary crystalline salt contained arsenic, one sample several years old containing a trifle over 5 grains of A_2O_3 to the pound. The other two contained respectively 1½ and 2.16 grains to the pound. The author seems to consider these quantities "only small amounts." He also fails to state which of the several methods reviewed by him were followed, nor does he give any details of experiments made.—Amer. Drugg., August 27, 1900, 103.

BORON.

Borates of the Alkaline Earths — Formation and Characters. — L. Puvrade describes the method of obtaining borates of the alkaline earths. By fusing together a slight excess of magnesia with equal molecular weights of boric anhydride and potassium hydrofluoride he has obtained tribasic magnesium borate, $3MgOB_2O_3$, in the form of transparent crystals, insoluble in boiling water, unaffected by dilute acetic acid, but readily dissolved in mineral acids. By employing magnesium chloride instead of magnesia, boracite, recognized by its tetrahedric crystals insoluble in strong cold hydrochloric acid, is obtained. Lime and its carbonate afford an analogous compound, $3CaOB_2O_3$ crystallizing in prisms, insoluble in cold, but decomposed by hot water, but the substitution of calcium chloride does not give a compound similar to boracite, but a series of chloro-compounds. Strontia and baryta behave like lime, giving $3BaO,B_2O_3$ and $3SrOB_2O_3$, which are less affected by boiling water than the lime salt.—Pharm. Journ., Mar. 9, 1901, 289; from Comptes rend., 132, 257.

SILICON.

Iron Silicide—Preparation and Presence in Industrial Ferro-Silicons.— P. Lebeau prepares crystalline iron silicide, $SiFe_2$, by the action of copper silicide on excess of iron at a high temperature. The fused mass is treated with dilute nitric acid to completely dissolve out the cuprous compounds, when the iron silicide remains. The crystals are brilliant and have an iron-grey color. This compound is identical with the silicide already

described by Henri Moissan. It is only slightly attacked by acids and alkalies, with the exception of concentrated or dilute hydrochloric acid, which completely dissolves it. This compound is found in industrial ferro-silicons containing 10 to 20 per cent. of silicon. To these it communicates its properties. Those compounds containing more than 15 per cent. of silicon are only very slightly attacked by nitric acid, unless finely powdered.—Chem. News, Nov. 2, 1900, 219; from Compt. rend., *131*, No. 15, Oct. 8, 1900.

CARBON.

Artificial Diamonds—Historical Notes.—J. F. Llewellyn read an interesting paper on the manufacture of artificial diamonds, in which he gives a concise account of the historical facts connected with the natural as well as the artificial article. The paper must be consulted in the original, in Proc. Mo. Pharm. Assoc., 1900, 48–51.

Animal Charcoal—Absorbent Action on Alkaloids from Solutions.—H. Laval has investigated the well-known absorbent action of animal charcoal on solutions of the alkaloids and their salts. He has experimented with ordinary animal charcoal, pure animal charcoal containing 90 per cent. of carbon, tricalcic phosphate obtained by the complete incineration of bone ash, and with precipitated tricalcic phosphate. He finds that both the latter absorb notable quantities of alkaloids from alcoholic or from aqueous solutions, the precipitated form being slightly more active. Ordinary animal charcoal is yet more active, but pure animal charcoal (90 per cent.) is markedly the most absorbent of all. The length of time of contact does not influence the amount of alkaloid removed from solution, which is increased with the quantity of charcoal employed without being directly proportional to this quantity. The weaker the alkaloidal solution the greater is the amount absorbed by the same proportion of charcoal to the alkaloid. The nature of the solvent influences the amount of alkaloid removed by the charcoal; aqueous solutions losing more than alcoholic. Boiling alcohol will remove from charcoal the alkaloids it has extracted from watery solutions. For the same weight of charcoal, the absorption increases rapidly with the concentration of the alkaloidal solution. It is unaffected by temperatures between 15° and 100° C. The nature of the acid combined with the base is without material influence on the result, different salts of the same alkaloid having virtually the same co-efficients of absorption. The amount removed from alkaloidal solutions of the same strength by the same proportion of charcoal varies with different alkaloids. Thus 10 Gm. of pure animal charcoal will remove 95 per cent. of the strychnine in 100 Cc. of a 1 per cent. solution, while it only removes 75 per cent. of quinine, 73 per cent. of morphine, and 68 to 69 per cent. of atropine, cinchonine, and cocaine from aqueous solutions of the same strength.—Pharm. Journ., Aug. 18, 1900, 214; from Bull. de Pharm. du Sud-Est, *5*, 195.

Carbides of Neodymium and Praseodymium—Preparation and Chemical Relations.—According to Henri Moissan, the oxides of neodymium and praseodymium, when heated in presence of carbon in the electric furnace, are transformed into the crystalline carbides of formulæ NeC_2 and PrC_2. These carbides decompose water in the cold, with production of a mixture of hydrogen carbides and the hydrated oxide. The author has already shown that the three carbides of the alkaline earths, prepared in the electric furnace, give, by their decomposition of water, only pure acetylene; on the other hand, aluminum carbide gives, under the same conditions, only methane. It is known that neodymium and praseodymium belong to the cerium group, a group of metals placed, from consideration of its properties, between the metals of the alkaline earths and aluminum. It is curious to notice that neodymium and praseodymium carbides give, when placed in contact with water, a complex mixture of hydrocarbons, rich, however, in acetylene and methane. Further, it should be mentioned that the quantity of acetylene given by these different carbides diminishes from cerium to neodymium, and that neodymium and praseodymium, metals so closely allied as to have been for a long time confounded under the name of didymium, give with water a mixture of carbides of a very similar composition. Finally, the carbides of cerium, lanthanum, neodymium, and praseodymium correspond to the general formula RC_2.—Chem. News, Nov. 9, 1900, 231; from Compt. rend., Oct. 15, 1900.

Samarium Carbide—Preparation and Characters.—Henri Moissan states that samarium oxide, at the temperature of the electric furnace and in presence of carbon, forms a crystallized carbide of formula SaC_2. The composition of this carbide is comparable with that of the carbides of cerium, lanthanum, neodymium, and praseodymium. It decomposes cold water in the same way as the carbides of the alkaline earths, giving a complex mixture of hydrocarbons very rich in acetylene. It has a density of 5.86, a yellow color, and, when examined under the microscope, has a crystalline appearance—the particles having an hexagonal shape. This substance burns brilliantly at 400° in a current of oxygen. The decomposition of water by the carbide brings the metal samarium nearer to the yttrium group, and removes it further from the rare earths belonging to the cerium group.—Chem. News, Dec. 28, 1900, 315; from Compt. rend., Dec. 3, 1900.

Carbon Tetrachloride—Pharmaceutical Uses.—G. Arend employs carbon tetrachloride for the purification of balata gum (which see, under "Materia Medica"), and incidentally suggests that it may replace chloroform and other solvents advantageously in numerous pharmaceutical operations.—Pharm. Centralh., Oct. 18, 1900, 332.

Tetrachloride of Carbon—Questionable Value of Shaking Out Alkaloids from Their Solutions.—J. Schindelmeiser records experiments made with

tetrachloride of carbon, which has been recommended as a solvent in place of chloroform for shaking out alkaloids. He finds that this commercial article is invariably contaminated with carbon disulphide, and that it must therefore first be purified before it can be used at all. Its purification is effected by fractionation, only that portion being employed which boils at 76° C. But even then "it is not well suited for the separation of alkaloids in the course of toxicological work, since it gives inseparable emulsions, which cannot be broken down, even on addition of considerable quantities of alcohol. The one thing in its favor is that it dissolves out but little contaminating impurities, and the author has found it to give good results when applied to the method of Hilger and Kuester.—Pharm. Ztg., Mar. 6, 1901, 193; from Chem. Ztg., 1901, No. 12.

Carbon Disulphide—Commercial Quality.—Charles H. LaWall and Robt. C. Purcel report the results of examination of twelve samples of carbon disulphide, representing several hundred pounds. The sp. gr. ranged from 1.2608 to 1.2779 (average 1.2652). All contained traces of dissolved sulphur, and a few showed sulphurous acid.—Proc. Pa. Phar., 1900, 160.

Liquid Carbonic Acid—Industrial Production for the Soda Fountain.—Frederick T. Gordon has written an interesting paper in which he describes the methods modernly in use for the production of liquid carbonic acid for soda fountain use. The liquefied gas is so rapidly supplanting the old way of making gas in generators from various materials, or even buying soda water ready charged, that, the author very correctly thinks, there is every reason why the druggist should know the ins and outs of his supply if he would be able to talk intelligently on it to the inquiring customer. This information the author supplies in his present paper, which will be consulted with profit in Amer. Journ. Pharm., May, 1901, 237–242.

Carbon Dioxide—Determination in Carbonates.—R. E. Divine suggests a process for the determination of carbon dioxide in carbonates which is based on the principle of Pettenkofer's process, namely—absorption of the carbon dioxide by a measured quantity of standard baryta water, and titration of excess of the latter with standard hydrochloric acid, using phenolphthalein as indicator. The apparatus is simple, and is described in the paper; the process itself is said to yield fairly accurate results, requiring less expenditure of time than the ordinary gravimetric method. The carbonate is decomposed by sulphuric acid, except when an insoluble sulphate is formed, in which case tartaric acid is used. In working with sodium carbonate the following figures were obtained: 41.33, 41.42, 41.51, 41.32, 41.37, 41.34 and 41.36 per cent. Theory requires 41.36 per cent. —Pharm. Journ., Dec. 8, 1900, 647; from Journ. Amer. Chem. Soc., *22*, 473.

Carbon Dioxide—Determination in the Atmosphere.—J. Walker describes a modification of Pettenkofer's bottle method for the determination of atmospheric carbon dioxide, which gives results accurate to 0.1 vol. carbon-dioxide in 10,000 vols. air, when a bottle of 2.6 liters capacity is employed. The usual error due to absorption of carbon dioxide during titration is avoided by filtering the residual baryta solution into a known quantity of hydrochloric acid, and titrating back with standard baryta. The filtration takes place under diminished pressure through asbestos contained in a Soxhlet filter tube, atmospheric air being entirely excluded during the process of filtering and washing. No special apparatus is employed, and a determination occupies only half an hour.—Pharm. Journ., Nov. 24, 1900, 571; from Proc. Chem. Soc., *16*, 164.

CYANOGEN COMPOUNDS.

Prussic Acid—The Kobert Antidote (Hydrogen Dioxide) for Poisoning.—A very complete account of Kobert's method of antidoting prussic acid poisoning by means of hydrogen dioxide is given in the annual report of E. Merck, Darmstadt, 1900, and reprinted in "Amer. Drugg.," Sept. 10, 1900 (137–138). Our present pharmacological knowledge opens four roads for dealing with cyanic poisoning: (1) One may dispense entirely with the use of a direct antidote and resort to artificial respiration, evacuation of the stomach, the use of stimulants, and symptomatic treatment of the convulsions—a method which has proved successful in light cases, but fails in grave cases. (2) The injection of cobaltic nitrate, which, although successful in repressing cyanic symptoms rapidly in the case of animals experimented on, cannot be regarded as sufficiently developed for the treatment of the human subject. (3) The conversion of the hydrocyanic acid into a haloid compound, by the free use of bromine or iodine, which, however successful when prussic acid has been used in small poisonous doses, has not proven reliable when large doses have been taken. Hence Prof. Kobert has relinquished all of these for (4) the hydrogen dioxide treatment, which involves the principle of the conversion of prussic acid within the system into oxamide by means of hydrogen dioxide in accordance with the formula $2CNH + H_2O_2 = C_2O_2N_2H_4$. For the details of the method of application—which, according to circumstances, may be by subcutaneous injection or by infusion into the stomach—reference must be had to the journals above mentioned.

Hydroferrocyanic Acid — Properties. — K. C. Browning describes the method of obtaining pure hydroferrocyanic acid and some of its properties. When heated, it begins to evolve hydrocyanic acid at 120°, and its decomposition is completed at 300°, ferrous cyanide remaining as a pale yellow powder, which, on further heating, above 430°, decomposes into iron, carbon, and iron carbide.—Pharm. Journ., Nov. 24, 1901, 572; from Proc. Chem. Soc., *16*, 172.

Mercuric Cyanide—Commercial Substitution by a Double Cyanide.—L. Soulard has met with a specimen of commercial mercuric cyanide, a compound largely employed in the hospitals of Bordeaux for the sterilization of surgical instruments, which, although occurring in fine crystals, was found markedly deficient in Hg, and, on further examination, proved to consist of the double cyanide of mercury and potassium, $HgCy_2 2KCy$, containing also 2.46 per cent. of free KCy as impurity. Mercuric cyanide occurs in white *opaque* crystals, is *odorless*, is *not acted on* by 1 per cent. H_2SO_4, and is soluble in 8 parts of water at 14° C. The substituted salt occurs in white *transparent* crystals, has a slight *odor* of HCy, and evolves that gas on treatment with 10 per cent. H_2SO_4. It is, moreover, soluble in 2 parts of water at 15° C. — Pharm. Journ., Jan. 12, 1901; from Bull. Soc. de Phar. de Bord., *40*, 325.

ALKALIES.

Sodium Hydroxide—Iron and Manganese an Impurity.—F. H. Alcock found during several months past that sodium hydroxide, in the form of sticks, invariably produced a deep brown colored solution. On standing a flocculent precipitate settled to the bottom, which was readily removed by straining through absorbent cotton, the filtrate becoming water white. The precipitate remaining on the cotton amounted to 0.013 Gm. from a stick weighing 12 Gm., and proved to consist of a manganese oxide, probably Mn_3O_4, together with ferric oxide.—Pharm. Journ., Aug. 25, 1900, 238.

Sodium Peroxide—Properties.—Geo. F. Jaubert finds that the description of sodium peroxide in text-books, as being a pure white substance, becoming transiently yellow, slowly deliquescing in air, and again solidifying as it becomes carbonated, is incorrect. He states that sodium peroxide is not white, but of a distinct yellow color. Of samples derived from various sources, only those which were contaminated with hydrate or carbonate were pure white, and were therefore markedly deficient in available oxygen. The yellow color of sodium peroxide deepens on heating until it develops a brown tint; when fused, the liquid has the color of black coffee. Finally, pure peroxide of sodium is not deliquescent in the air, even when exposed for several years. It gradually loses its yellow tint and becomes white, as it absorbs CO_2, but it shows no sign of deliquescence.—Pharm. Journ., Feb. 2, 1901, 105; from Comptes rend., 132, 35.

In continuation of his investigations of the characters of sodium peroxide, Mr. Jaubert finds that although sodium peroxide decomposes violently with the liberation of oxygen when treated with water, when exposed to the vapor of water, as in moist air, free from SO_2, no such decomposition takes place and no gas is evolved, but gradual hydration goes on without deliquescence. In this way various

Hydrates of Sodium Peroxide, from $Na_2O_2 2H_2O$ up to $Na_2O_2 8H_2O$ are

formed. The latter forms a snow-like, pure white mass, which dissolves in water at ordinary temperatures without liberating oxygen. It is less soluble in ice-cold water, so that it may be obtained in pearly scales by cooling a saturated solution. Its solution is accompanied by a great lowering of temperature, and even in acids, without a great development of heat; in the latter case it yields solutions of hydrogen peroxide of remarkable stability. It is itself very stable in the cold, but undergoes partial decomposition between 50–40° C., at the same time becoming deliquescent. Its chief use in the laboratory will be for the preparation of hydrogen peroxide, since, by dissolving it in an equivalent of acid, solutions of all strengths up to 30 to 35 volumes may be obtained.—Pharm. Journ., Feb. 9, 1901, 135: from Comptes rend., *132*, 86.

Sodium Peroxide—Analytical Use for the Separation of Iron, Chromium, Aluminum, etc.—Thos. S. Barrie observes that in the ordinary course of analysis the hydroxides of iron, chromium and aluminum are all precipitated together, and when zinc and manganese salts are also present they are carried down more or less at the same time. Using sodium peroxide, a separation of these metals can be effected thus:

The precipitate is treated with sodium peroxide as described above, and filtered. The solution contains chromium, which is detected as described, and also the aluminum and zinc; the former is precipitated by the addition of ammonium chloride in excess, and after filtering therefrom and adding acetic acid, zinc is detected by potassium ferrocyanide (white precipitate). The residue consists of the hydroxides of iron and manganese; the former is detected as usual by dissolving a part in dilute hydrochloric acid and adding potassium ferrocyanide; the latter by boiling the remaining part with nitric acid and lead peroxide, when a purple coloration is obtained (permanganic acid).—Pharm. Journ., Nov. 24, 1900, 579.

Lithium Bicarbonate—Questionable Existence in the Solid State.—Lyman F. Kebler observes that for some time past repeated inquiries have come for lithium bicarbonate, and certain manufacturers are supplying an article which they call by that name. While it is theoretically possible for this chemical to exist, the author questions whether it has ever been prepared. He has subjected a sample of so-called lithium bicarbonate to careful analysis. It consisted of white crystalline crusts, and when finely powdered dissolved in 75 parts of water at 15° C. An estimation as sulphate indicated the presence of 98.39 per cent. of lithium carbonate, while an acidimetric assay gave the figure 97.97 per cent. An estimation of the lithium as phosphate showed the article to contain 18.42 per cent. of lithium, which corresponds to 97.39 per cent. of lithium carbonate. These figures prove the sample examined to be nothing but crystallized lithium carbonate. This salt contains 18.918 per cent. of lithium and is soluble in 75 parts of water at 15° C., but when it is suspended in water and a cur-

rent of carbon dioxide is introduced to saturation, one part of the chemical will dissolve in 20 parts of such water. It is generally believed that under these conditions lithium bicarbonate is formed, and this would contain, if in a solid condition, 10.294 per cent. of lithium.—Amer. Journ., Pharm., Dec., 1900, 580.

Cæsium— Method of Obtaining Various Salts. — C. Chabrié has prepared and described a number of salts of cæsium about which hitherto there has been very little exact information.

Cæsium Bromide, CsBr, was prepared by the double decomposition of cæsium sulphate and hydrated barium bromide. The solution was evaporated to dryness, calcined, redissolved, and fractionally crystallized.

Cæsium Iodide, CsI, is prepared in a similar manner, with barium iodide, and first evaporated at 60° C., under reduced pressure, and finally *in vacuo* over H_2SO_4, gave white well-formed cubical crystals. With hydrofluorie acid two compounds of cæsium were obtained.

Neutral and Acid Cæsium Fluoride. — By partially saturating hydrofluoric acid with pure cæsium carbonate and crystallizing *in vacuo* the *acid fluoride*, CsFlHFl, was obtained in long hygrometric needles. On heating this body just short of the fusing point, or by heating it to dull redness with ammonium fluoride the residue was neutral cæsium fluoride, CsF, which crystallized in cubical crystals.

Cæsium Chromate, Cs_2CrO_4, was obtained in fine bright yellow needles, several centimeters long, by treating a slight excess of neutral silver chromate with cæsium chloride.

Cæsium Dichromate, $Cs_2Cr_2O_7$, was obtained in small brilliant red crystals by dissolving the equivalent of chromic anhydride in the aqueous solution of the neutral salt. — Pharm. Journ., May 4, 1901, 556; from Comptes rend., *132*, 678.

ALKALINE EARTHS.

Barium Hydride, BaH_2—Preparation and Characters.—G. Trouvé has obtained the compound BaH_2 by heating an amalgam of barium and mercury in an atmosphere of hydrogen to a temperature of 1400° C. It forms a greyish mass, having a crystalline fracture when cold. It is a remarkably stable body, slowly volatilizing without decomposition at about 1,400° C., and melting at 1,200° C. In moist air it is quickly covered with a layer of $Ba(OH)_2$; in a current of nitrogen it forms the nitride Ba_3N_2 at a little above red heat. It is decomposed by water, forming $Ba(OH)_2$ and liberating hydrogen.—Pharm. Journ., May 11, 1901, 589; from Comptes rend., *132*, 963.

Barium Dioxide—Commercial Quality.—Charles H. La Wall and Robt. C. Purcell examined fifteen samples of barium dioxide, representing as many different casks imported from Germany. Ten of the samples aver-

age 86.09 per cent. of BaO_2, and were perfectly satisfactory, both as regards the ease with which it was hydrated and the strength of hydrogen dioxide produced from it. The other five samples were below the U. S. P. requirements (80 per cent. BaO_2), averaging 72.76 per cent., and great difficulty in properly hydrating them, while the hydrogen dioxide produced from them was in most cases deficient in strength.—Proc. Pa. Pharm. Assoc., 1900, 162.

Lime — Improved Gravimetric Determination. — W. H. Hess gives a method for the rapid gravimetric determination of lime, which he considers an improvement on the usual oxalate method, being less tedious and more accurate. By the method suggested the lime is precipitated as oxalate in the usual way, and the ignition is carried to the point of removing the filter from the residue of lime. The platinum crucible is allowed to cool partially, and then there is added an equal quantity of chemically pure dry ammonium nitrate, and twice as much chemically pure fused ammonium sulphate. The crucible is tightly fitted with a cover, tilted at an angle of about 30°, allowing the tip of the cover to project outward, and gently heated first at the tip of the cover, gradually bringing the flame under the crucible as the reaction becomes less violent. The reaction is complete when fumes of ammonia are no longer given off; intense ignition should be avoided. — Pharm. Journ., Dec. 29, 1900, 753; from Journ. Amer. Chem. Soc. *22*, 471.

Calcium Salts — Rapid Estimation in Drinking Water. — Gasselin recommends the following rapid method for the indirect titration of the calcium salts in drinking waters. Three standard solutions are employed: (1) Oxalic containing 0.63 Gm. per liter; (2) potassium permanganate containing 0.316 Gm. per liter; and (3) decinormal H_2SO_4 solution. The permanganate solution is first standardized by warming 10 Cc. of the oxalic acid solution with 10 Cc. of the decinormal acid and 10 Cc. of distilled water in a porcelain capsule to about 70° C. The permanganate is then run in until a permanent rose tint is observed, the number of Cc. used up being noted. Then 50 Cc. of the standard oxalic acid is run into a 150 Cc. flask, 2 drops of ammonia and 50 Cc. of the water to be examined are added. The flask is well shaken several times in the course of ten minutes. The solution is then filtered, and 20 Cc. withdrawn for titration as described above. The difference in the observed figures indicates the amount of standard oxalic acid used up by the lime, every Cc. of that solution being equivalent to 0.00028 Gm. of CaO.—Pharm. Journ., Jan. 5, 1901, 2; from Journ. de Pharm. [6], *12*, 556.

Gypsum—Method of Hardening.—In view of the usefulness of hardened gypsum for a variety of electro-technical purposes, the "Pharm. Centralh." (Dec. 13, 1900, 779) gives the following methods: (*a*) The powdered gypsum is intimately mixed with 2–4 per cent. of powdered marshmallow root and with 40 per cent. water kneaded to a paste. After an hour the

mass is so hard that it may be filed, cut or bored; an addition of 8 per cent. marshmallow root powder makes it thicker. Marshmallow root powder may be replaced by dextrin, gum arabic or glue. (*b*) Gypsum, 6 parts, is mixed with freshly slaked lime, 1 part, and when the required shape is made it is moistened with a concentrated solution of magnesium sulphate. (*c*) The gypsum, after burning, is digested with 10 per cent. solution of alum and after drying again burnt; on the addition of water the gypsum crystallizes to a marble-like mass, the so-called marble cement.

Heavy Magnesium Oxide—Variability.—F. H. Alcock calls attention to the variability in loss of weight on heating magnesium oxide obtained from different sources, one gram each of six samples losing respectively 0.055 Gm., 0.065 Gm., 0.047 Gm., 0.053 Gm., 0.074 Gm., 0.061 Gm. A quantity taken from a large stock bottle at top lost 0.066 Gm., and from the bottom 0.052 Gm. This substance therefore requires careful storage, and before removal from the bottle brisk agitation.—Pharm. Journ., April 13, 1901, 461.

EARTHS.

Aluminum—Successful Construction of Apparatus by a Process of Welding.—The firm of Heracus has succeeded in constructing various apparatus of aluminum in which, although composed of a number of pieces, no solder of any kind is employed, the joints being effected by a process of welding discovered by them. The discovery is of great importance, and will doubtless result in the more extensive use of aluminum for a great variety of purposes. The exclusion of solder, and consequently of foreign metals, prevents the corrosion of the joint at the points of contact under the influence of the galvanic current, a matter of great importance in the electro-technic industry.—Apoth. Ztg., July 28, 1900, 513; from Ztschr. f. Angew. Chem., 1900, 750.

New Hydrate of Alumina—Conditions of Formation and Composition.—V. Zunino has determined that the greyish-white tongue-like protuberances formed when aluminum, which has been superficially amalgamated by plunging into mercury, is exposed to the air, are composed of a new hydrate of alumina containing a little metallic aluminum. This new hydrate has the composition $Al_2O_35H_2O$. The ease with which aluminum amalgam is decomposed by water, may prove useful in organic reductions.—Chem. News, Mar. 1, 1901, 103; from Gazz. Chim. Ital. (1) *30*, 194.

Pure Yttria—New Method of Preparation from Gadolinite.—W. Muthmann and R. Böhm recommend a new method for the separation of the earths of gadolinite, which consists in their fractional precipitation as chromates. The mixture of the rare earths in the form of oxides is triturated with more than double its weight of CrO_3, and diluted with a large

quantity of water. A lively reaction takes place, the whole going into solution in the form of dichromate. The solution is placed in a large retort and brought to boiling point, while at the same time steam is passed continually through the mass, and a solution of CrO_4K_2 is added drop by drop, the amount added being an aliquot part of the quantity necessary for complete precipitation. The authors have in this manner treated a sample of commercial *pure yttria*, operating in six portions. The true yttria was collected in the last two fractions; in less than a fortnight they obtained 15 per cent. of the original mixture in a state of perfect purity. Chem. News, Jan. 28, 1901, 36; from Berichte, vol. xxxiii, p. 42.

Thorium—Composition of the Hydride and of the Nitride.—C. Matignon and M. Delépine have made investigations with the view to fixing the composition of thorium hydride and of thorium nitride. The existence of

Thorium Hydride was shown by Winkler. The author prepared it directly from the metal, and has determined it to have the composition ThH_4.

Thorium Nitride was first produced by Chydenius by the action of ammonia on thorium chloride, while Moissan obtained it by the action of ammonia on thorium carbide. But one of the authors had shown that thorium metal combines directly with nitrogen, and the nitride was so prepared for the present investigation, a somewhat higher temperature being required than for the preparation of the hydride. It has the formula Th_3N_4, and is decomposed by water, even in the cold, according to the equation, $TH_3N_4 + 6H_2O = 3Th_2 + 4NH_3$.—Chem. News, Febr. 1, 1901, 59; from Compt. rend., Jan. 7, 1901.

INDIUM.

Indium—Place in the Classification of Elements.—C. Chalrié and E. Rengade have obtained the double sulphates of iridium and two well-defined alkali metals. This fact, added to observations made by other chemists, seems to be sufficient to definitely include indium amongst the metals capable of giving sesquioxides. Apparently, also, the property of indium hydrate of being soluble in the alkalies, brings this metal nearer to aluminum than iron. It is worth remarking that indium acetylacetonate, so well-defined and beautifully crystalline, is not volatile and so cannot be used to determine the atomicity of indium. This latter fact brings indium nearer to iron and removes it from aluminum; the acetylacetonate of aluminum being volatile without decomposition.—Chem. News, Jan. 25, 1901, 47; from Compt. rend., Dec. 31, 1900.

Indium—Molecular Weight and Valence.—Further researches on indium are recorded by Chalrié and Rengade. They made the alums of indium with rubidium and cæsium, and decomposed them by heat (with barium oxide ? Rep.) into sodium oxide, barium sulphate and cæsium or rubidium

sulphate, all three substances being accurately estimated. The numbers obtained agree very well with the formula $SO_4Rb_2 + (SO_4)_3In_2 + 24H_2O$. Indium acetylacetonate is not volatile without decomposition, and so, to determine the atomicity of indium, the rise in boiling-point of a solution of indium acetylacetonate in ethylene bromide has to be determined; this gives a molecular weight of 405, and a further proof that indium is trivalent.—Chem. News, March 22, 1901, 142; from Compt. rend., Feb. 25, 1901.

FERRUM.

Ferri Sulphas Exsiccatus, B. P., 1898—Necessity of Higher Temperature for its Preparation.—R. C. Cownly and J. P. Catford observe that the lowering of the standard of purity of dried ferrous sulphate from the 97½ per cent. standard of 1885 to 92½ per cent. in the B. P., 1898, appears to have been made in deference to the general occurrence of lower percentages in the published results of tests made on commercial samples. Their experience leads them to believe that the official directions are responsible to some extent for the failure to maintain the higher standard. It is impossible to completely expel six molecules of water at a temperature of 100° C. Moreover, the time required for heating at that temperature to constant weight is so much prolonged that oxidation is inevitable. If, on the other hand, a sand-bath be employed, after preliminary drying in a current of warm air so that the salt may not melt in its water of crystallization, the temperature may be raised to 120° to 140° without risk, and a perfectly dried product may thus be obtained within one hour. During the heating the stirring should be "frequent" instead of occasionally, and after reducing the product to fine powder, this should be heated a few minutes before placing it into bottles.—Chem. & Drugg., Sept. 15, 1900, 475.

Iron Scale Compounds—Analytical Scheme for their Identification.—Joseph J. Mayer publishes a scheme for the analytical determination and identification of the numerous scaled preparations of iron. It is based upon numerous experiments, and a wide experience has proven the method to be reliable and satisfactory. The author's paper may be consulted in Drugg. Circ., Febr., 1901, 27.

NICKEL AND COBALT.

Nickel and Cobalt — Qualitative Separation. — The method of qualitatively separating nickel and cobalt devised by Villers, depending on the action of hydrogen sulphide on an alkaline solution of their tartrates, is usually attended with certain difficulties which have been the subject of investigation by O. F. Tower. As this method is commonly carried out the solution of the sulphides of nickel and cobalt in aqua regia is evaporated to expel chlorine, and after suitable dilution sufficient tartaric acid is added to prevent precipitation by sodium hydroxide, which is then added until

the solution is strongly alkaline and hydrogen sulphide run in to saturation. Cobalt sulphide is precipitated, while nickel sulphide remains in solution, imparting to it a dark color, brown when a very small quantity of nickel is present, and jet black with larger quantities. The difficulties and their causes are: (1) The separation of free sulphur in the liquid, to which hydrogen sulphide has been added, so that, if nickel is present and cobalt is not, the black solution will color the sulphur, making it difficult to distinguish the product from precipitated cobalt sulphide; (2) the sodium chloride present in the solution, whilst aiding the complete precipitation of cobalt sulphide, may cause some nickel sulphide to be precipitated, which, in the absence of cobalt sulphide, might readily be mistaken for it. It is owing to the formation of a compound in which these metals replace the hydrogen atoms of the alcoholic hydroxyl groups of tartaric acid that their hydroxides are not precipitated from solutions of their tartrates.—Pharm. Journ., Dec. 1, 1900, 619; from Journ. Amer. Chem. Soc., *22*, 501.

ZINC.

Zinc—Urobilin a Sensitive Reagent.—See under "Urinary Compounds."

Calamine—Analysis of Commercial Samples.—T. S. Barrie observes that calamine or native carbonate of zinc is sometimes found in a fairly pure condition, but generally in union with calcium carbonate, silicious matter, and other ores of zinc. It occurs both in the crystalline and earthy form, the latter being prepared for medicinal use by roasting to render more friable, and elutriation to free it from gritty particles. The B. P. of 1885 required a complete solubility of calamine in dilute acid, but such calamine is rarely found, very impure native calamine or artificial mixtures being generally sold. The author obtained a number of samples on the market and examined them qualitatively and quantitatively, and of these samples three are reported by him as follows:

No. 1. Yellowish Powder.	Per Cent.	No 2. Pink Powder.	Per Cent.	No. 3. Pink Powder with Red Particles.	Per Cent.
Zinc Carbonate	60.8	Zinc C.	73	Zinc Carbonate	54.8
Barium Sulphate	18.9	Bar. Sulphate	10.9	Ignited Iron Oxide	3.6
Iron Oxide (ochreous)	1.2	Iron Oxide	3.3	Sodium Sulphate	traces.
Manganese Dioxide,	traces	Manganese Dioxide	traces	Manganese	none.
Silica	19.1	Moisture, Sodium Sulphate, Sodium Carbonate	12.8	Calcium Sulphate	41.6
	100.0		100.0		100.0

Sample No. 1 was received as powdered ore (?); both No. 2 and No. 3 are decidedly artificial, No. 2 being a very badly prepared article containing much free alkali.—Pharm. Journ., July 7, 1900, 2.

COPPER.

Copper — Sensitive Reaction. — According to the experiments of A. Bellocq, if a drop of solution of copper sulphate, of 1 or 0.5 per cent. is allowed to fall into a liter of potable water, and a zincic reagent is added drop by drop until the reaction is strongly alkaline, and the whole is then allowed to stand for four or five hours until it is perfectly limpid, a floccuculent precipitate will be formed, varying in appearance from pure white to dirty grey, yellow, or brown, according to the purity of the water. On adding to this precipitate, collected in a small porcelain crucible and dried, a small excess of HCl and then ammonia, the characteristic blue color of copper is obtained. The sensitiveness of the reaction exceeds the above limits. — Chem. News, March 22, 1901; from Journ. Pharm. Chim. (6) xii, No. 7.

TUNGSTEN.

Tungsten Monophosphide—Formation and Characters.—E. Defacgz has obtained a new tungsten phosphide, WP, by fusing together amorphous tungsten bi-phosphide, WP_2 and copper phosphide in a blast furnace to about 1200° C. for four hours, and then allowing the fused mass to cool slowly, finally dissolving the button in dilute nitric acid. The monophosphide so obtained forms fine prismatic, grey crystals with a metallic lustre, have a density of 8.5, and are permanent in the air at ordinary temperatures, but decompose at a red heat, forming tungstic oxide. They are not acted upon by alkaline solutions, nor by aqueous or gaseous HCl, nor by aqueous hydrofluoric acid, but are rapidly oxidized by mixtures of alkaline nitrates and carbonates at fusing point. The author failed to obtain the same compound by heating the ingredients in the electric furnace. Where the temperature exceeded 1200° C., nothing but a metallic powder, containing no phosphorus, was left insoluble in dilute nitric acid. — Pharm. Journ., Feb. 2, 1901, 105; from Comptes rend., *132*, 32.

MOLYBDENUM.

Blue Molybdenum Oxide—Composition.—The composition of the blue oxide of molybdenum has long been the subject of much controversy. Berzelius attributed to it the formula, MoO_24MoO_3. Rammelsberg gave the composition as being Mo_2O_5 for the oxide, and $Mo_2O_53H_2O$ for the hydrated oxide; other workers have given somewhat different formulas. Experiments now recorded by Guichard seem to point out that the blue oxide is a true salt, the

Molybdate of Molybdenum Dioxide.—Availing himself of the fact that

the oxide is very slightly soluble in dilute hydrochloric acid, and is but slowly dissolved in water, when it has been precipitated from perfectly cold solutions, he has obtained the oxide in the form of a precipitate, which when prepared *in vacuo* in the cold, has the formula $MoO_2.4MoO_3.6H_2O$. Under other conditions the amount of water of hydration may vary. By the action of heat on the various hydrates it is not, however, possible to prepare the corresponding anhydride. It forms a dark blue powder, having the density 3.6 at 18° C. It is very soluble in water when precipitated from warm solutions, but much less so when thrown out from perfectly cold liquids. It is soluble in alcohol, 95 per cent. It loses a portion of its water at about 100° C.; after total dehydration at a red heat a mixture of brown dioxide and white trioxide is left. Chlorine forms with it the volatile compound Mo_2OCl_2 and MoO_3. Gaseous hydrochloric acid forms $MoO_3 2HCl$, which is volatile, and the dioxide MoO_2. Aqueous vapor, at a red heat, converts it into molybdic acid, which distils in the current of steam. By strong hydrochloric acid it is decomposed, forming the tetrahydrochloride, $MoO_2 4HCl$, and molybdic anhydride. It would seem, therefore, that the blue oxide is a true salt, the molybdate of molybdenum dioxide.—Pharm. Journ., March 30, 1901, 391; from Bull. Soc. Chim., *25*, 181.

Molybdenum Sulphate — Preparation of a New Crystalline Salt.—Bailhache observes that sulphuric acid dissolves molybdic acid when heated, and forms with it a molybdic sulphate, MoO_3SO_3, which has been known for some time. This compound consists of colorless crystals, which are very soluble in water and are deliquescent. If the sulphuric solution is now reduced, it becomes blue, but no further crystalline body can be obtained. However, under certain conditions, it is possible to obtain with great facility a new compound derived by the reduction of the double anhydride MoO_3SO_3, and perfectly crystalline. A rapid current of hydrogen sulphide is used for the reduction. The substance is produced in the form of a crystalline sand, very dark olive-green in color, and analysis shows it to have the formula $Mo_2O_5.2SO_3$.—Chem. News, March 22, 1901, 142; from Compt. rend., Feb. 25, 1901.

VANADIUM.

Vanadium—Colorimetric Method of Estimation.—L. Maillard finds that the well-known reaction of hydrogen peroxide upon vanadic acid, resulting in the formation of the highly-colored pervanadic acid, can be utilized for the colorimetric determination of very small quantities of vanadium in the form of vanadic acid, or of an alkaline vanadate. To make the test, 10 Cc. of the neutral solution under examination are poured into a stoppered graduated cylinder of 25 Cc. capacity, from 1 to 5 Cc. of pure hydrochloric acid added, and this followed by a mixture of equal volumes of ether and of commercial hydrogen peroxide of 10 volumes

strength. The mixture, after being well shaken, separates into two layers, the aqueous one being of a more or less intense red color, the ether layer perfectly colorless. The volume of the aqueous layer is then brought to 15 Cc. with distilled water, and the color compared with standard solutions diluted for the purpose in the usual way. The coloration remains unimpaired for hours, and even days, so that the measurements need not be made with undue hurry.—Chem. News, July 13, 1900, 19; from Bull. Soc. Chim. (3) xx., No. 12.

Vanadium—Formation and Characters of Double Thiocyanates.—A. Cioci describes the method of obtaining the double thiocyanates of vanadium and potassium, sodium, and ammonium. They are obtained by saturating a solution of VdO_3 in sulphuric acid with sulphurous acid, driving off the excess of sulphurous acid, and reducing the mixture in a negative cell until no further green precipitate is produced with potash. The calculated quantity of the thiocyanate is then added and the product formed, insoluble sulphate of the alkali being precipitated by alcohol.

Vanadium and Potassium Thiocyanate, $Vd(CNS)_3.3KCNS.4H_2O$, is obtained in form of red crystals having a variegated appearance by reflected light. It loses $4H_2O$ at 100° and decomposes at 110°. Its solution yields a precipitate of $Vd(OH)_3$ with the alkalies, the alkaline earths, and their carbonates; black precipitate with cupric sulphate, a yellowish-red one with silver nitrate, and a white one with lead acetate.

Vanadium and Sodium Thiocyanate, $Vd(CNS)_3.3NaCNS.12H_2O$, forms greyish-red crystals, fusible at 68° in their own water of crystallization.

Vanadium and Ammonium Thiocyanate, $Vd(CNS)_3.3NH_4CNS.4H_2O$, forms dark green crystals which yield a blood red powder. Its behavior to heat and precipitants is like that of the potassium double salt.—Chem. News, Oct. 12, 1900, 183; from Gazz. Chim. Ital. (1), xxix, 300.

ARSENIC.

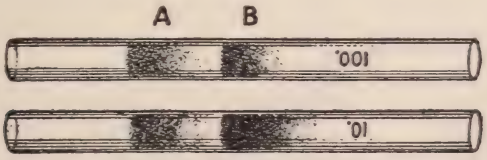
Arsenic—Review of Reinsch's, Marsh's and Gutzeit's Tests.—Dr. B. H. Paul and A. J. Cownley have experimentally investigated and review the applicability of Reinsch's Marsh's, and Gutzeit's tests for the detection and chemical identification of arsenic, with particular reference to the detection of this poison in beer. They find the

Reinsch method to be very convenient on account of its easy application, but they also find that it is deficient in delicacy for this purpose. In their experiments they determined that 3085 grain measures of beer (= 200 Cc.) to which 0.02 grains of arsenous oxide had been added gave a sublimate that was scarcely visible and very slight as compared with one equal to 0.02 grain; so that the presence of that quantity was not indicated, nor, when operating upon that quantity of suspected beer, would the presence of arsenic be detected with any degree of certainty, unless

the proportion of arsenic in the beer amounted to more than 0.4 grain per gallon. While the

Marsh Test is not so readily applicable as that of Reinsch, it is a most excellent means of detecting the presence of extremgly minute quantities of arsenic, and also of separating arsenic from proportionally large quantities of material, and collecting it in a form that admits of identification in various ways. Operating in the well known way (by heating the tube through which the hydrogen arsenide passes from the generator) with a water solution containing 0.01 grain and 0.001 grain respectively in 50-grain measures, the mirrors were obtained as shown in the accompanying illustration (Fig. 51), the parts of the mirrors marked *A*, which are nearest to the point where the tube is heated, being brown and comparatively dull, while the parts marked *B* are black and brilliant; and a similar re-

FIG. 51.



Mirrors.

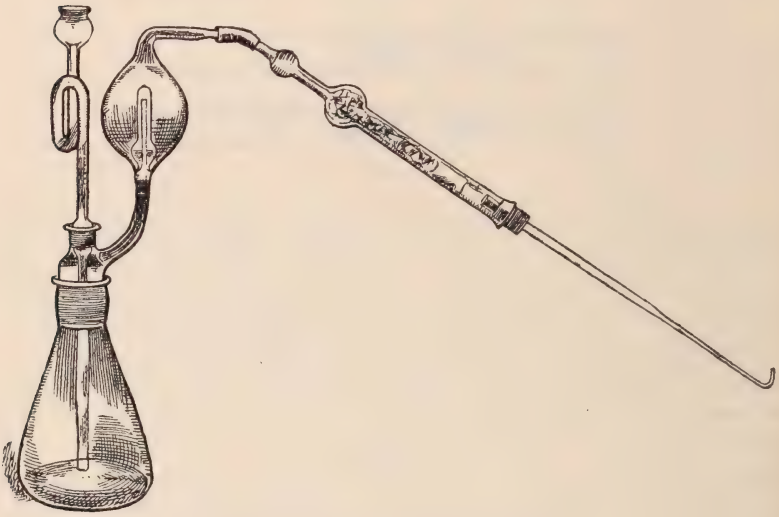
sult can be obtained with smaller quantities, quite as distinct a mirrior being obtainable from solutions containing 0.001 grain in 2000-grain measures, as with 0.001 grain in 50-grain measures, the only difference being that the experiment requires to be continued longer. Thus, with the stronger solution the mirror is formed completely within from 3 to 10 minutes, while with the weak solution the mirror began to form in forty minutes, and was not fully developed until after three hours. The application of the Marsh test *direct* to beer is, however, attended with considerable inconvenience, on account of the frothing and the sluggish evolution of gas. In the experiments made it was found that while 0.1 grain of arsenous oxide in one pint of beer could be very plainly detected, 0.01 grain was unrecognizable, the smallest quantity from which a mirror could be produced being about 0.05 grain. To detect one part of arsenous oxide in one million parts of beer, no less than a gallon of the beverage would be required for the experiment. The third test under consideration,

Gutzeit's Test, is certainly superior, in point of delicacy, to either Reinsch's or Marsh's test; but, depending on the formation of a yellow compound by the action of hydrogen arsenide upon mercuric chloride, and capable of indicating the presence of fifteen millionths (0.000015) grain of arsenic (in a solution containing one part of arsenous oxide in 7,000,000 parts), the result is ambiguous because of the fact that very

minute traces of hydrogen sulphide, if present, produce a stain on the mercuric chloride paper precisely similar to the stain produced by hydrogen arsenide, and no means are known of distinguishing the one from the other. The authors, therefore, regard the production of the stain by Gutzeit's test as unreliable evidence of the presence of arsenic; but, on the other hand, it is most useful as a preliminary to the application of the Reinsch or Marsh test, chiefly by showing that further examination is desirable or not, for a negative result may generally be taken as satisfactory evidence that the article tested is free from arsenic.—Pharm. Jour., Feb. 9, 1901, 136–138.

Arsenic—New Apparatus for Marsh's Test.—Charles T. Tyrer has designed a new apparatus designed to test for arsenic by Marsh's test, which is shown by Fig. 52. It avoids the usual doubly perforated cork, or rub-

FIG. 52.



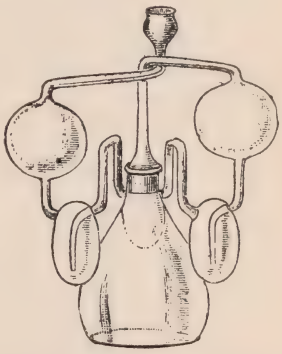
New Apparatus for Marsh's Test.

ber bung, which, used once for an arsenical article, may afterwards condemn an arsenic-free one. The flask is marked at 200 Cc. The hydrogen in its exit bubbles through a 10 per cent. solution of lead acetate in the bulb, so that hydrogen sulphide, if present, is absorbed, but hydrogen arsenide or phosphide is not. The gas then passes through the potash tube, so that it enters the exit tube quite dry. This tube is calibrated to a standard and invariable size in order that the reductions in two or more experiments may be comparable.—Chem. and Drugg., March 23, 1901, 494.

Arsenic — Apparatus for the Application of Gutzeit's Test. — William

Kirkly observes that the successful application of Gutzeit's test for arsenic to substances containing sulphites or other compounds liable to yield hydrogen sulphide, demands extreme care. After subjecting the process to a series of experiments, the author finds that he can use it with the greatest confidence by causing the generated gas to traverse three bulbs containing lead acetate solution, and for this purpose has devised the apparatus shown by Fig. 53. The gas is generated in the flask, and traverses five bulbs, of which the three lower ones are half filled with 5 per cent. solution of normal lead acetate; finally, it reaches the small thistle head, which is covered with a filter paper cap bearing a dried drop of mercuric chloride solution (1 in 20). The arsenical liquid is mixed with from 5 to 10 Cc. of the purest redistilled hydrochloric acid, and the volume adjusted to a fixed quantity — say 40 Cc. in a 150-Cc. flask. When the bulbs have been charged with the lead acetate solution, and the test paper fixed in position, a piece of rod zinc of definite size—say 15 Mm. by 5 Mm.—is introduced, and the apparatus is put on one side for a greater or less time, at the discretion of the analyst. The third bulb should not have its efficiency exhausted at the expiration of the test; this can be ascertained by comparison with the two preceding bulbs, in which there will be, if hydrogen sulphide is present in the gas, a precipitate of lead sulphide. For the purpose of making comparative estimations of minute quantities of arsenic it is imperative that the apparatus should be used of a standard size. The flask in the apparatus described has a capacity of 150 Cc.—Pharm. Journ., Jan. 26, 1901, 80.

FIG. 53.



Apparatus for the Application of Gutzeit's Test.

Arsenic—Apparatus for Applying Gutzeit's Test.—In the course of a discussion on the relative merits of Marsh's, Reinsch's and Gutzeit's tests for arsenic, at a meeting of the Society of Chemical Industry, London Section, March 4, 1901, Mr. Ling explained his preferences for Marsh's test for the estimation of arsenous acid in beer, while Mr. A. H. Allen expressed himself as content with a lower delicacy by using a modification of Reinsch's test for determination in beer, while the more delicate Marsh's test is preferred by him for arsenic determinations in glucose. As regards Gutzeit's test, Mr. Allen's experience is limited, but he does not consider a yellow stain (Gutzeit) to be as good as a mirror (Marsh) or crystals of arsenic (Reinsch). In this connection a description is given of the apparatus described by C. T. Tyrer for applying Gutzeit's test for

arsenic, which is shown by Fig. 54. The hydrogen is generated in the flask *E*, and passes up the tubes *G* and out by the holes *c* in the inverted tubes *F*. A little water is contained in the chambers *H*, and the lead or

FIG. 54.

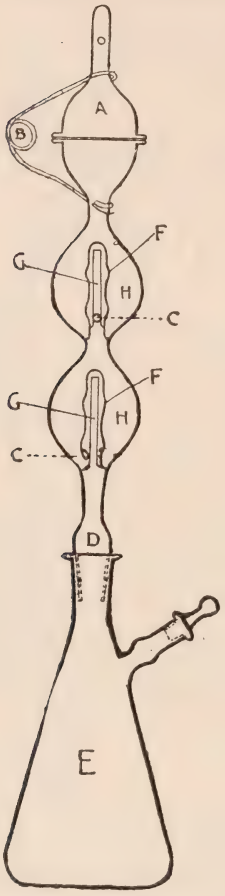
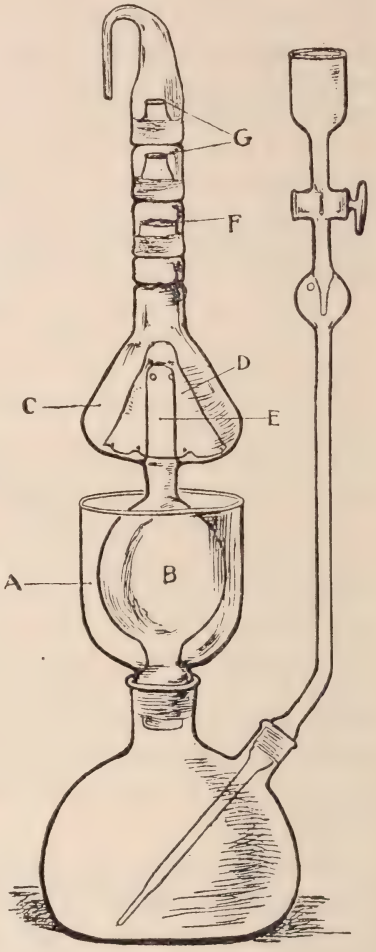


FIG. 55.



Apparatus for Gutzeit's Arsenic Test

silver paper is placed below the funnel-shaped cap *A*. The drawing is one-third of the actual size.—Chem. & Drugg., Mar. 9, 1901, 388.

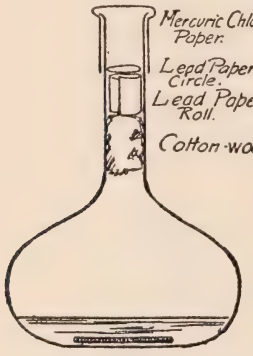
Arsenic—Apparatus for an Improved Gutzeit Test.—At a meeting of the Society of Public Analysts, London, April 3, 1901, F. C. J. Bird read a paper on the Gutzeit test for arsenic. He points out the possible fallacies of the test, and the necessity that constant conditions be observed in order to secure uniform results. These are best met by ensuring (1)

complete solution of a given weight of zinc in a given time; (2) maintenance of a constant temperature; and (3) limiting the volume of solution in the generating flask—conditions which are best fulfilled by completely dissolving 4 Gm. of zinc in fifteen minutes at a boiling temperature in a volume which should not exceed 100 Cc. The author has devised for this purpose the apparatus shown by Fig. 55. The funnel-tube on the right hand is for delivering the acid slowly into the flask. The cup shaped vessel, *A*, filled with water, serves as a condenser for the vapor entering the watch-shaped bulb *B*. The cooled hydrogen passes into the tube *E*, and through holes at the top of this tube is led under the inverted cone, *D*, through a 10 per cent. solution of lead acetate contained in *C*. Thence the gas passes upwards through discs of mercuric chloride paper at *G* and *F*, these discs being prepared by moistening white filter paper with 5 per cent. mercuric chloride solution, drying, cutting them out with a cork borer of 5 Mm. diameter, and fastening them at *G* and *F* by moistening the edges of the glass with gum. These acquire an orange color in about ten minutes in the presence of $\frac{1}{100}$ milligramme of As_4O_6 in the substance tested. If considered desirable, the mercuric chloride disc at *F* may be replaced by a disc of lead acetate paper. The quantity of pure hydrochloric acid used is to be in all cases half the volume of the test liquid, and it should be delivered in ten minutes, after which the contents of the flask receive five minutes further boiling. The author gives directions for identifying the stain produced.—Chem. & Drugg., April 13, 1901, 600.

Arsenic—Questionable Reliability of Gutzeit's Test for its Presence in Beer, Sugar, etc.—Referring to a previous paper in which they directed attention to the relative applicability of various tests for arsenic in cases where very small quantities have to be sought (see Proceedings, 1900, 721), Dr. B. H. Paul and A. J. Cownley take occasion to re-direct attention to a statement made in that paper that apparently positive indications given by the Gutzeit test cannot be relied upon alone as evidence that the material tested actually contains arsenic. In confirmation of that view they have very recently become aware of several instances in which samples of beer, collected in London and subjected to the Gutzeit test, gave results which might have been interpreted as showing that some of the samples of beer contained arsenic to the extent of more than 0.1 grain per gallon. Further examination of the beer by application of the Marsh test showed that no arsenical mirror was obtainable, and that arsenic was not present in the beer; the Gutzeit indication being probably due to the presence in the beer of some sulphur compound reducible by nascent hydrogen to hydrogen sulphide, a minute trace of which acts upon mercuric chloride paper in the same way as hydrogen arsenide, producing a yellow stain exactly resembling the stain showing the presence of arsenic. An apparently positive indication of arsenic by the Gutzeit test

should therefore never be relied upon unless it is confirmed by the Marsh test, or in some other way by evidence more positive than the production of a yellow stain upon mercuric chloride paper. But even with Marsh's test some difficulties are presented that may lead to uncertain results when the quantity of arsenic present is so small as has been reported (0.01 or 0.02 grain per gallon). In such cases no distinct mirror could be obtained by the direct application of the Marsh test to beer. In the case of glucose made with arsenical sulphuric acid the difficulties are not so great, since in such it is likely present in much larger quantity.—Pharm. Journ., Dec. 15, 1900, 690.

Arsenic—Detection in Glucose.—Edwin Dowzard, after trying modifications of all the usual tests for arsenic in glucose, finds the following to give the best results, a preliminary (blank) experiment being made in order to test the reagents: Into a flat-bottomed flask of about 130 Cc. capacity, with a neck about 3½ inches long and ½ inch in diameter, place a mixture of 30 Cc. of water, 5 Cc. of hydrochloric acid and 0.5 drop of a 5 per cent. solution of platinic chloride; then, immediately after having introduced a rod of pure zinc (1½ inch by $\frac{3}{16}$) into the flask, place connecting into the neck of the flask: (1) a plug of cotton; (2) a roll of filter paper, 12x¾ to 1 inch, freshly soaked with a 25 per cent. solution of lead acetate and still damp; (3) a disc of filter paper, soaked in the same solution, observing that this is from ½ to ¾ inch below the mouth of the flask. Finally, place a cap of dry mercuric-chloride paper over the mouth of the flask. These several details are shown in the drawing (Fig. 56). After 30 minutes, the mercuric-chloride paper is taken off and examined, this examination being always made by full daylight, never by gas or electric light. There should not be the slightest coloration. Having become satisfied of the purity of the reagents, the experiment is repeated, precisely as in the blank experiment, with 15 Gm. of glucose dissolved in a mixture of 20 Cc. of distilled water, 7 Cc. hydrochloric acid and 0.5 drop of 5 per cent. platinic chloride solution. The ¾-inch roll of damp lead-acetate paper, under this test, is rarely darkened beyond one-half the length, but if the whole should be darkened, the test must be repeated, using a roll one inch high. If the top portion of the roll has not been affected, it may be safely assumed that all the H_2S has been absorbed. Under the conditions of this test, a faint but quite perceptible yellow spot is produced by 0.00005 Gm. of arsenous acid.—Chem. & Drugg., Dec. 8, 1900, 921.



Apparatus for Detecting Arsenic in Glucose

Arsenic—Application of Reinsch's Test for its Detection in Beer.—In view of the numerous papers that have been elicited from chemists who have been concerned in the recent epidemic of poisoning in Lancashire, England, Alfred H. Allen, after reviewing some of the principal suggestions that have been made regarding the best method of detecting arsenic in beer, states that he has found Reinsch's test to be the most satisfactory for this purpose, and gives the following particulars concerning his method of carrying it out: The hydrochloric acid is preliminarily purified by distilling off about one-tenth, this fraction containing the minute trace of arsenic that it may originally contain. He operates, as a rule, on 100 Cc. of the beer, and, as a preliminary treatment to eliminate sulphites, adds hydrochloric acid and a little bromine water, and boils the liquid for a few minutes. To obviate the difficulty caused by the fact that arsenic acid only responds to Reinsch's test after prolonged boiling, and in the presence of much acid, a little solution of cuprous chloride in hydrochloric acid is next added, which reduces the arsenic to the arsenous condition. On now introducing about one square centimeter of copper-foil, and boiling, any arsenic is promptly deposited on the copper. The boiling is continued for thirty minutes, any water lost by evaporation being replaced. If the copper has undergone darkening it is dried in the water oven, cut into strips, and heated in a narrow tube, when a characteristic deposit of arsenous oxide, in the form of micrscopic octahedra or tetrahedra will be obtained if the deposit on the copper was due to arsenic. Unless these crystals can be obtained, he is not satisfied that arsenic is present. In doubtful cases a better definition of the crystals can be obtained by filling the tube with water, which acts only very slowly on crystallized arsenous oxide, and, in his opinion, is preferable to alcohol. This process has the advantage that the arsenic is actually seen and identified as such. Several such deposits can be united, and the arsenic again deposited on copper, or subjected to Marsh's test. The author, furthermore, mentions that since writing his notes the Expert Committee appointed by the Manchester Brewers' Association have issued their report and strongly advocate Reinsch's test for the detection of arsenic in beer.—Pharm. Journ., Jan. 5, 1901, 4–5.

Arsenic—Examination of the Sublimate Obtained by Reinsch's Test.—M. H. Stiles, referring to Reinsch's test as recommended by the Manchester Commission (see preceding abstract), states that he has found that the examination of the arsenical sublimate under the microscope is much facilitated by the adoption of the following method of sublimation. Following the details furnished by the Commission, a strip of copper foil, after having been boiled with 200 Cc. of the beer and 30 Cc. of pure hydrochloric acid for forty-five minutes, is washed successively with water, alcohol and ether, and dried. The strip is then placed in a clean, dry test-tube, 3½ in. by ½ in., containing a strip of glass 3 in. by ⅜ in.; this

is held in position by a flat steel spring about ¼ in. wide folded like a pair of tweezers and having just enough strength to keep the glass slip firmly pressed against the side of the test-tube. Before attempting sublimation the lower part of the test-tube should be carefully and uniformly warmed, the copper strip being kept at the other end of the tube by tilting the latter. After warming, again incline the tube and proceed with sublimation, doing this at as low a temperature as possible, for the boldness of the resulting crystals depends much upon careful attention to these particulars. To indicate the face of the slip on which the sublimate has been received, should one be obtained, a small label may be placed at the opposite end of it, bearing a reference number or letter describing its source. At the end of the operation withdraw the copper foil, remove the spring, cork the tube, and set aside for subsequent microscopic examination.—Pharm. Journ., Jan. 5, 1901, 4.

Arsenic—Biological Detection.—Abel and Buttenberg base a method for the detection of arsenic on the observation that certain moulds, when grown in the presence of arsenic, produce arsenical compounds which are readily detected by their garlic odor. The suspected material, finely powdered, is added to moistened bread crumb in a flask, which, with its contents, is sterilized and afterwards inoculated with the mould—preferably *Penicilium brevicaula*, but *Aspergillus glaucus* or *A. niger* may also be used. The flask is then capped with a well-fitting rubber cap and incubated at 37° C. for two days. If arsenic is present, the garlic odor is readily perceived on removing the rubber cap. The one-tenth of a milligram can be detected in this way.—Pharm. Journ., Nov. 3, 1900, 490; Ztschr. f. Hyg., *32*, No. 3.

Arsenic—Detection in Presence of Sulphites, etc.—Jas. F. Smith observes that when hydrogen sulphide and hydrogen arsenide are heated together a mutual reaction occurs; the products are sulphide of arsenic, sulphur and free hydrogen. This takes place when the gases are passed slowly through a tube heated to redness, as in Marsh's test for arsenic; it is also deposited from the flame when the mixed gases are burnt, and a piece of cold porcelain is brought into it. The author suggests this as a convenient method for the detection of arsenic in the presence of sulphur compounds that give off hydrogen sulphide when heated with zinc and acid, not only in inorganic solutions, but extracts similar to beer, without previous treatment. The experiment is conducted in Marsh's apparatus, and in the same way, the only difference being in the results obtained in the heated tube, or in cold porcelain, as stated. Certain precautions are, however, necessary to obtain all the arsenic as sulphide in the heated tube. The solution under examination must be added in small quantities—1 to 2 Cc.—at a time to the acid and zinc, and to keep the heated tube at red heat for about 1 inch in the centre. When cold this

deposit is washed with a little carbon disulphide to remove free sulphur, then with a little ammonia or alkali-hydrate to dissolve the sulphide of arsenic, the tube washed with a few drops of water several times. The solution and washings are neutralized with hydrochloric acid, and if the precipitate produced is large, it may be filtered off and tested by usual method; but if the solution is only slightly yellow it must be evaporated, and, after addition of a few drops of strong nitric acid, again evaporated to dryness on a water bath, the residue taken up by a few drops of hot water and tested by Marsh's method in the usual way. By this method, 15 parts of arsenic in 1,000,000 were detected in the presence of a large qauntity of bisulphite in 5 Cc. of beer without previous treatment.—Chem. News, Jan. 4, 1901, 2.

Arsenic—Separation and Determination in Presence of Antimony and Tin.—L. E. Sayre describes a method derived by H. P. Cady for the separation of arsenic, antimony and tin qualitatively, which he considers a possible improvement on the official method of detecting arsenic as an impurity in such compounds as bismuth subnitrate and subcarbonate, magnesium sulphate, and a more delicate and satisfactory test than that of Bettendorff in many places where it is employed for the detection of this poisonous impurity in chemical salts. The details of Mr. Cady's process for the separation of the elements above named are as follows: Three or four Cc. of a solution containing them are placed in a test tube, about one and a half times its volume of concentrated hydrochloric acid is added, and hydrogen sulphide is then passed through the liquid. Arsenic, whether in the arsenous or arsenic condition, is precipitated as sulphide, while the antimony and tin remain in solution. If the arsenic were in the arsenous condition, the precipitate will settle out, leaving the supernatant liquid clear, while if it were in the arsenic condition the sulphur formed by its reduction will remain suspended, rendering the liquid turbid, so that one can detect not only the arsenic, but also ascertain whether it is in the "ic" or "ous" condition. If arsenic acid is found, it will, of course, be necessary to test for arsenous in some other way. After the arsenic has been precipitated, the test tube containing the solution and precipitate is inclined at an angle of 35°, and 2 or 3 Cc. of water, saturated with hydrogen sulphide, is carefully poured down the side of the tube, stirring up the solution as little as possible. Almost as soon as the first drops of water touch the solution, antimony sulphide is separated as an orange-red ring or layer floating upon the highly acid solution. Upon further dilution the yellow stannic sulphide is separated above the antimony sulphide, and blending into this, the brown to black stannous sulphide. After standing a few moments there will be a marked line of division between the antimony and the tin. A tube containing these substances when treated in this way presents a very striking appearance with its several highly colored layers. Since arsenic acid and stannous salts rapidly react

upon each other, of course these cannot exist in the same solution. By the above method 0.1 milligram of arsenic is easily detected even in the presence of a gram of antimony. The limit for antimony and tin is naturally somewhat higher.—Drugg. Circ., April, 1901, 70.

Arsenous Acid—Method of Collecting a Micro-Sublimate.—For the convenient collection of a sublimate of As_2O_3 for microscopical examination, Dr. Sheridan Deelépine has devised an apparatus which, together with its application, is described as follows: A small thimble-shaped copper cone, 5/8-inch in diameter and 1/2-inch high, is inserted into a thin iron plate through a central hole, the open end of the cone having a rim which rests on the edge of the aperture. Before use, this copper cup is heated over a small Bunsen, then cooled. A few pieces of the dry blackened copper foil from Reinsch's test are then dropped in, the top of the cone is covered with a 7/8-inch cover glass, and the heat applied to the copper in the usual way. In this manner if arsenic be present a sublimate of As_2O_3 will be obtained on the cover glass, which can be mounted and preserved for future reference.—Pharm. Journ., Febr. 2, 1901, 105; from B. M. J., No. 2,089, 84.

Arsenic—Concerning its Occurrence in Sodium Phosphate.—The recent observations of a contamination of sodium phosphate with arsenic (see Proceedings, 1900, 696), leads G. Pinchbeck to review the possible sources of the arsenic in the coupound. This is doubtless primarily the sulphuric acid, of which two general kinds are mentioned by the author: (1) The kind obtained by burning sulphur or sulphides, producing H_2SO_3, which is subsequently oxidized to form H_2SO_4; and (2) the kind that is obtained by the decomposition of sulphates (pyrites) by heat. The latter supplies about six-sevenths of the total supply of H_2SO_4, and would probably supply all, being so much cheaper than the former, if it were not for the fact that all pyrites contain arsenic, and this finds its way into H_2SO_4 as arsenous acid. The author's paper gives a brief account of the different methods and expedients that are resorted to for the elimination of the arsenic in the manufacture of acid from pyrites.—Pharm. Journ., Aug. 18, 1900, 216.

Arsenic Tribromide—Practical Process and Apparatus for its Preparation.—E. Jory has obtained arsenic tribromide in a state of purity by the direct action of bromine fumes on arsenic. A matrass containing bromine is placed on a water-bath fitted with a cork with two holes and connected through a Welter S-tube with an escape-tube bent in such a manner that the condensed bromine will fall back again into the matrass; this tube is connected to a combustion-tube, 2 Cm. in diameter and 15 to 18 Cm. long, containing the arsenic; the other end of this tube is contracted and connected with a flask to receive the tribromide; the second hole is fitted with a glass tube for making communication between the interior of the

matrass and the air. The matrass is gently heated, and when the bromine fumes reach the arsenic, the attack takes place energetically, and owing to the heat generated the tribromide of arsenic is melted and runs into the flask. When cooled it is perfectly white and well crystallized.—Chem. News, March 22, 1901, 144; from Journ. Pharm. Chim. (6), xii, No. 7.

Arsenic Tri-iodide—Impurity of the Commercial Compound. — D. Dupouy observes that arsenic tri-iodide is of late years prescribed for internal use in the treatment of lymphatic and scrofulous children; a solution of the compound, as supplied to the pharmacies, in water being employed, made in the proportion of 1 Gm. to 100 Gm. of water. This liquid is sold under the name of "solution of iodide of arsenic," an incorrect name, since water does not behave to the metalloidic iodide as a simple solvent, but, on the contrary, as a very energetic dissociating agent. Consequently the solution does not contain arsenic tri-iodide, but the products of its dissociation—arsenous anhydride and hydriodic acid. While studying this dissociation, the author observed that the article supplied commercially leaves a residue of variable color after treatment with water, while the liquid was sometimes odorless, at others had a disagreeable smell. He has examined a number of commercial samples, which he divides into four types, all of these differing from each other, and finds that the commercial iodide is not chemically pure, but that the residues, though very voluminous in appearance from three of the types, are of very little weight and do not materially reduce the proportion of pure iodide of arsenic. It remains to be determined whether the amount and character of impurity is sufficient to prevent the therapeutic efficiency of the commercial iodide.—Chem. News, Sept. 14, 1900, 130; from Bull. Soc. de Pharm. de Bordeaux, 1900.

Ammoniacal Arsenates of Cobalt — Formation of Three Distinct Compounds.—O. Ducru finds that if a solution of cobalt rich in ammoniacal salts, and containing a sufficient proportion of free ammonia, is added to arsenic acid or a double arsenate, a voluminous gelatinous precipitate comes down of a violet-blue color. If this is kept on the water-bath, the precipitate gradually becomes modified, contracts and changes to a dark red body, the microscopic examination of which shows it to be completely crystallized. These compounds are the ammoniacal arsenates of cobalt, and it is found that cobalt forms three distinct ammoniacal arsenates, derived from erythrine by the displacement of water by ammonia, molecule for molecule. These three salts have the following compositions: $(AsO_4)_2Co_3 + \frac{1}{2}NH_3 + \frac{1}{2}H_2O$; $(AsO_4)_2Co_3 + \frac{3}{4}NH_3$; and $(AsO_4)_2Co_3 + \frac{3}{4}NH_3 + \frac{1}{2}H_2O$.—Chem. News, Nov. 16, 1900, 243; from Compt. rend., Oct. 22, 1900.

Ammoniacal Arsenates of Nickel — Formation of Three Distinct Compounds. — Similarly to the ammoniacal arsenate of cobalt (which see), O. Ducru has obtained three distinct nickel compounds, viz.: $(AsO_4)_2Ni_3 +$

$\frac{3}{4}NH_3 + H_2O$; $(AsO_4)_2Ni_3 + \frac{3}{4}NH_3 + \frac{1}{2}H_2O$; and $(AsO_4)_2Ni_3 + \frac{1}{2}NH_3 + \frac{1}{2}H_2O$. To prepare the ammoniacal arsenates of nickel (and of cobalt), it is necessary to use solutions in which the amount of free ammonia is determined. These are heated in sealed tubes surrounded by metal foil in an air bath at 155° C. — Chem. News, Nov. 23, 1900, 255; from Compt. rend., Oct. 29, 1900.

London Purple—Composition.—J. K. Haywood publishes the results of his analysis of London purple, which show that the arsenic present in this pigment is chiefly in the "ic" condition, so that it consists mainly of calcium arsenite, together with some calcium arsenate and an organic dye residue, and not, as assumed up to the present time, of calcium arsenate and the organic dye residue.—Pharm. Review, Feb., 1901, 75; from Jour. Amer. Chem. Soc., *22*, 800.

Paris Green—Determination of Impurities and Method of Assay.—Otto J. S. Boberg, after giving the history of Paris green, describing its preparation and the technical and other uses to which it is applied, describes the following simple and easy way to estimate impurities in Paris green, which is based upon the fact that pure Paris green is readily soluble in ammonia water, while all common adulterants, such as silica, gypsum, plaster of Paris, bone dust, powdered heavy spar, etc., are all insoluble. Take 100 grains of the suspected Paris green, treat with ammonia water, filter and wash with ammonia water until the residue is not colored with copper salt. Dry the residue and weigh. Each grain of the dried residue equals one per cent. of adulterations. The efficiency of Paris green as an insecticide depending largely on the amount of arsenic it contains, it is sometimes of interest to know just how much arsenic there is in a sample. The author mentions several methods that have been recommended for estimating the quantity of arsenic in the presence of copper, but finds the following method to give the most accurate results: One Gm. of Paris green is dissolved in 100 Cc. distilled water acidified with nitric acid added carefully drop by drop and just enough to effect solution. The liquid is then warmed to boiling point and treated with hydrogen sulphide till complete precipitation of the sulphides of copper and arsenic. After careful washing with water containing some hydrogen sulphide, the precipitate is repeatedly treated with fresh yellow ammonium sulphide, which will completely dissolve the arsenic trisulphide. By filtering and washing the undissolved black copper sulphide, the filtrate will contain all the arsenic present. Then treat the filtrate with hydrochloric acid in excess and proceed as above described. The small amount of copper sulphide, which is dissolved by the ammonium sulphide, does not at all interfere with the final precipitation of the arsenic as ammonic-magnesic arsenate, as it is retained in the ammoniacal solution and can be washed off completely from the arsenical precipitate. The quantity of copper may be determined by converting the copper sulphide into copper nitrate

and subsequent careful ignition and weighing as cupric oxide (CuO).—Proc. Wis. Pharm. Assoc., 1900, 27–30.

ANTIMONY.

Tetra-Antimonic Acid and Compounds—Preparation and Characters.—A. E. Delacroix has made a series of researches on the antimonic acids and their salts. He finds that the method of Sendereus for preparing antimonic hydrate yields a gelatinous precipitate, difficult to wash, and that a pulverulent hydrate may be obtained, and easily washed, by the following modification: Dissolve 1 Kgm. of antimony trichloride in 1 liter of hydrochloric acid, sp. gr. 1.19, heat the mixture to 100°, and add 250 Cc. of nitric acid, sp. gr. 1.38, as quickly as the violence of the reaction will allow. The cooled liquid is then treated with water, to produce the hydrate. This being rubbed up with water at 50°, is then boiled for four or five minutes; the liquid becomes clear, and is then cooled rapidly. The product does not contain any triantimonic acid. A saturated solution, prepared at 70°, contained 53.89 Gm. Sb_2O_3 per liter, and had a density of 1.0497. By treating copper acetate with potassium tetra-antimonate,

Tetra-antimonate of copper $(Sb_2O_5)_2CuO$, is obtained. This, when well washed, on treatment with ammonia yields, among other products,

Ammoniacal Antimonate of Copper, $Sb_2O_5,CuO,3NH_3,9H_2O$, in the form of small blue hexagonal crystals.

Antimonate of Copper and Potash, produced by treating the freshly precipitated tetra-antimonate of copper with potash, was obtained only in form of solutions, part of which was congealed. Some green flakes obtained had the composition $Sb_2O_5CuO_{0.569}K_2O_{0.399}$, while a part of the green solution deposited, on heating to 80°, a voluminous precipitate of a

Basic Antimonate of Copper, which, after thorough washing and drying, has the composition $(Sb_2O_5)_2(CuO)_{4.86},7.06H_2O$. — Chem. News, April 4, 1901; from Bull Soc. Chim. (3), xxv, No. 6.

BISMUTH.

Bismuth—Electrolytic Estimation.—Dimitry Balachowsky observes that up to the present time it has not been possible to obtain, by electrolyzing salts of bismuth, a sufficiently adherent deposit to allow of washing and weighing. The author has, however, now obtained a deposit of metallic bismuth adhering to the cathode and allowing of washing and quantitative determination. The conditions necessary to obtain this result are: (1) Slight acidity of the solution; (2) Absence of large quantities of Cl, Br, I; (3) Not too strong a current (maximum 0.060 ampère); (4) Unpolished electrodes. The author's experiments were carried out on sulphate and nitrate of bismuth, but not on the chloride.—Chem. News, Aug. 17, 1900, 84; from Compt. rend., *137*, No. 3, July 13, 1900.

Hydrated Bismuth Oxide—Method of Purification.—Paul Thibault has succeeded in obtaining hydrated bismuth oxide, $Bi_2O_3H_2O$, in a state of perfect purity by reversing the usual process, and precipitating it from an alkaline medium by means of a dilute acid. He mixes crystalline bismuth nitrate, 20 Gm., with glycerin, 30 Gm., and gradually adds water, 100 Gm. When solution is complete, after filtering if necessary, the liquid is gradually poured, with constant agitation, into an excess of potassium hydrate solution. When the hydrated oxide at first formed has redissolved, dilute sulphuric acid is cautiously added, until the free alkali is almost neutralized, care being taken to avoid an excess of acid. The gelatinous white precipitate washed by decantation, when dried over H_2SO_4 at normal temperatures, has the formula $Bi_2O_3H_2O$; it then forms a gritty white powder. It may be kept in the gelatinous state indefinitely under water, and is not affected by light. From it perfectly pure organic salts, such as the benzoate, salicylate and gallate, may be obtained, entirely free from contamination with a mineral acid. This is not the case with these salts prepared from the hydrated oxide precipitated in the usual way, and in view of their wide application in dermatology the point would appear to be one of considerable practical importance.—Pharm. Journ., Jan. 12, 1901, 28; from Journ. de Pharm. [6], *12*, 559.

Bismuth Subnitrate—Variation from the B. P. in Composition.—F. A. Upsher Smith has subjected four samples of bismuth subnitrate obtained from as many leading English makers and designated "B. P.," to examination in order to ascertain how nearly they might correspond to the B. P. requirement. He gives in detail the experiments made, from which he has drawn the following conclusions:

1. Bismuth subnitrate of four different English makers as prepared at the present day is uniform in composition as regards Bi_2O_3, varying slightly in acidity and in the moisture it contains.

2. English samples contain less Bi_2O_3 than some American samples examined by Curtman and Kebler.

3. They are more basic and slightly more acid than the B. P. formula demands.

4. For purposes of calculation a formula corresponding to 80 per cent. of oxide must be taken, and not the B. P. formula.

5. It is undesirable to publish a formula for the salt, unless a detailed method of preparing it be inserted.

6. The determination of oxide by ignition might replace the sulphide determination.

7. A method might with advantage be inserted for determining the N_2O_5.—Pharm. Journ., Dec. 15, 1900, 692–696.

MERCURY.

Mercury—Determination in Ammoniated Mercury, etc.—In place of the

official process of the B. P., 1898, for determining the mercury in ammoniated mercury—namely, distillation with lime—which requires the use of special apparatus and care. C. T. Bennett recommends the following simple process, which depends on the reduction of the ammoniated or other mercuric compound by means of hypophosphorous acid. One or two grammes of the mercury compound is dissolved in water (if soluble), or in a small quantity of hydrochloric acid to which one or two drops of nitric acid has been added. If necessary, the solution is filtered and the filter thoroughly washed with distilled water. The filtrate is now placed in a tared porcelain dish and 10 Cc. of hypophosphorous acid (30 per cent.) slowly added. Reduction at once takes place, a grayish-black precipitate of metallic mercury being formed. On heating over a water-bath, the particles agglomerate and settle to the bottom of the dish. The clear supernatant liquid is then tested with a few drops of hypophosphorous acid and a further quantity added if a precipitate is formed. The supernatant liquid is then decanted into a counter-balanced filter, which collects any fine particles of mercury floating on the surface. To remove the free phosphoric acid and excess of hypophosphorous acid two or three washings with warm distilled water are necessary, the washings being decanted into the counter-balance filter, which is also well washed and set to dry in a water oven. The mercury in the dish is dried over a water-bath, when it collects into a single bright metallic globule, which is weighed. The weight of mercury obtained, plus the weight of the particles (if any) in the counter-balanced filter, multiplied by 100 and divided by the quantity of the compound taken, will give the percentage of mercury in the compound. If the sample be perfectly free from extraneous matter the same result can be obtained by direct reduction with hypophosphorous acid, without previously dissolving and filtering.

The pill mass (pil. hydrarg.) can readily be assayed in a similar manner to that detailed, but the organic matter must first be completely oxidized with nitric acid, avoiding large excess however of the latter, or the subsequent action of the hypophosphorous acid will be violent, and loss may be occasioned through spurting.—Pharm. Journ., Nov. 24, 1900, 575, 576.

Mercury—Influence on Aluminum and Magnesium.—Gustave Le Bon calls attention to the influence of minute traces of mercury, aluminum and magnesium on the chemical behavior of each other. Thus pure mercury does not oxidize sensibly in the cold, and does not decompose either in hot or cold water; magnesium does not oxidize in the air nor decompose cold water; aluminum does not sensibly decompose cold water, and is not attacked by nitric or sulphuric acids. A strip of magnesium ribbon may be floated on a bath of mercury without change, but if it be freshly polished and introduced vertically into a tube of mercury, it is attacked in a few hours. The mercury then commences to oxidize in the cold, and to decompose water. If the layer of black oxide formed be re-

moved, a fresh layer is immediately formed. As little as 1 : 14,000 of its weight of Mg. is sufficient to produce this action. The same results may be obtained by shaking together Hg and Mg with a little water acidulated with 1 per cent. of HCl. The magnesium is also affected ; it acquires the property of decomposing water and rapidly oxidizes. If strips of aluminum are shaken with a little mercury and then withdrawn and carefully wiped, they commence to oxidize almost immediately, and if thrown into water are rapidly converted into alumina.—Pharm. Journ., Dec. 8, 1900, 647 ; from Comptes rend., *131*, 706.

Ammonium Amalgam — Confirmation of Existence. — The question of the existence of an ammonium amalgam appears to be finally settled in the affirmative as the result of the researches of Coehn and Dannenberg. Their investigation of the electrolytic tension of decomposition of the ammoninm salts with a mercury chloride, has given results perfectly analogous to those obtained with salts of the alkali metals, and experiments carried out under varying conditions, to ascertain the possibility of reducing the heavy metals from their solutions, show that the negative results previously obtained are due to the great instability of the ammonium amalgam. By preparing the amalgam electrolytically at a low temperature (0° C.), it appears to be much more stable, and does not exhibit, to any great extent, the spongy appearance peculiar to the amalgam prepared under ordinary conditions ; if then allowed to act on cold solutions of copper, cadimum and zinc salts, the formation of the corresponding heavy metal amalgams is easily observed. — Pharm. Journ., Jan. 26, 1901, 79 ; from Zeitschr. f. Anorg. Chem., *25*, 430, through "Nature."

Sodium Amalgams—Four Distinct Combinations.—Guntz and Férée have investigated sodium amalgams. They find that when sodium is dissolved in mercury and the mercury slowly cooled, beautiful crystals of the amalgam separate out. These are of the cubic form, and correspond to the formula $NaHg_6$. If, instead of extracting the crystals from the mercury the mass is compressed in leather by hand, still the same amalgam remains ; the liquid part, which is filtered off, is mercury saturated with sodium at the temperature of the experiment. The authors attribute this result to the fact of the compound $NaHg_6$ being a mixture of two amalgams, Hg_6Na and Hg_5Na. The latter amalgam has been obtained in a pure state. They have shown the existence of four distinct amalgams— Hg_8Na, Hg_6Na, Hg_5Na, Hg_4Na. With

Potassium Amalgams, the results obtained were not quite so definite.—Chem. News, Aug. 17, 1900, 84 ; from Compt. rend., *131*, No. 3, July 13, 1900.

Mercuric Salts—Reduction by Hydrogen Dioxide.—A. Kolb has observed that mercuric salts are reduced to mercury, in the presence of alkali by hydrogen peroxide, whereas the neutral or acid solution of the

salts are unchanged. In an alkaline solution of mercuric cyanide the salt is reduced to metallic mercury in 15–20 minutes on the water-bath with hydrogen peroxide. In ammoniacal solution with the addition of tartaric acid the reduction is quantitative.—Pharm. Journ., April 20, 1901, 485; from Chem. Centralblatt, *72*, 363.

Calomel—Advantage of the Phar. Germ. Test for Corrosive Sublimate.—K. Klingele finds that the test of the German Pharmacopœia for the presence of mercuric chloride in calomel, which directs that calomel be shaken with diluted alcohol and this tested for the mercuric salt, is more delicate than when water is used as a solvent. Calomel found in stock did not respond favorably to this test, indicating the presence of 0.02 per cent. of mercuric chloride. The manufacturer from whom the chemical was purchased states that at present he is unable to supply calomel which will stand this test.—Pharm. Rev., April, 1901, 179; from Pharm. Ztg., *46*, 79.

Mercuric Chloride—Volumetric Estimation when in Colored Admixture.—E. Rupp observes that the aniline colors, now frequently used in solutions and tablets of mercuric chloride intended for antiseptic use, interfere with the volumetric estimation of the mercury contained in them. He therefore proposes to precipitate the mercury with metallic iron, to oxidize the ferrous chloride formed with potassium permanganate—which destroys the dye—and then to estimate the iron with potassium iodide and thiosulphate. From 20 Cc. of a four per cent. solution of corrosive sublimate all mercury is precipitated when a few grammes of reduced iron are added and the mixture agitated frequently for an hour.—Pharm. Rev., Sept., 1900, 422; from Arch d. Pharm., *238*, 298.

Mercurous Iodide—Preparation by Precipitation.—F. B. Power reviews the different methods that have been recommended or are officially directed for the preparation of mercurous iodide, and gives the results of the examination of the products obtained by them. His results lead him to recommend the adoption in the proposed Indian and Colonial Addendum of the B. P. the product obtained by precipitation, since this is quite uniform in composition, and also quite stable when properly protected, while the evidence that has thus far been obtainable from its therapeutic use is also satisfactory.—Trans. Brit. Phar. Conf., 1900, 503–507.

Mercuric Iodide—Methods of Preparing it in Crystals.—F. Bordroux discusses different methods for obtaining crystalline mercuric iodide, and particularly those for its preparation in the wet way. Crystalline mercuric iodide can be obtained by dissolving an excess of the amorphous substance in potassium iodide, or, better, in concentrated boiling hydrochloric acid. On cooling, the salt separates out in octahedra, or in quadratic prisms of a bright red color. The yellow modification can be prepared either by sublimation or in the wet way by adding an excess of water to a solution

of mercuric iodide in alcohol. The author observes that when a small quantity of ethyl or methyl iodide is left in contact with a large excess of a solution of a mercury salt at ordinary temperatures, mercuric iodide is produced. This experiment succeeds with the chloride, nitrate, and sulphate of mercury, but the finest crystals are obtained when the acetate is used.—Chem. News, July 13, 1900, 24; from Compt. rend., *130*, No. 24.

Mercury and Potassium Double Salts — Preparation and Characters.—Wladimir Pawlow states that the double salts $HgI_2 2KI, 2H_2O$ and HgI_2-KI, H_2O may be obtained by dissolving the constituents in the molecular proportions in water, and allowing to stand in an exsiccator. By taking the proportions one molecule HgI_2 and two molecules of KI, the second compound is obtained first, and then the former from the mother liquor. The double salt HgI_2KI, H_2O melting at about 105° C., crystallizes in long needles, which are very hygroscopic and easily deliquesce in the air. They decompose with water into HgI_2 and KI, but are soluble in acetone and alcohol without decomposition. The double salt $HgI_2 2KI, 2H_2O$, is slightly crystalline and becomes moist in the air. It is soluble in water, acetone, ether and alcohol without decomposition. The author also describes the behavior of these compounds upon heating.—Pharm. Journ., April 20, 1901, 488; from Chem. Centralbl., *72*, 1763.

GOLD.

Gold—Crystallization.—A. Ditte observes that if gold is placed in contact with the vapors evolved when SO_3 and NaCl react on each other in a porcelain crucible—according to the equation: $8SO_3$ gas $+ 12NaCl = 6SO_4Na_2 + S_2Cl_2$ gas $+ 10Cl + 68.7$ Cal.—the whole is heated sufficiently to melt the contained mass of salt and sodium pyrosulphate, and the gold is found in a crystalline condition, the transformation taking place at a temperature lower than the fusing point of the metal. The author, furthermore, finds that platinum is affected in the same way.—Chem. News, Aug. 17, 1900, 84; from Compt. rend., *131*, No. 3, July 13, 1900.

Ancient Egyptian Gold Leaf—Composition.—J. H. Gladstone, calling attention to recent analyses by Berthelot of gold leaf from mummies of the VI and XII Dynasties, and of a specimen belonging to the Persian era, communicates the results of his own analysis of specimens of gold from caskets of the VI and XVIII Dynasties, and gives his results, together with those obtained by Berthelot, in the following table, in which the percentages of gold and silver found are alone given, all the other substances being classified under the heading of "organic matters, etc.," in conformity with the arrangement adopted by Berthelot:

King.	Dynasty.	Gold.	Silver.	Organic Matter, etc.	Observer.
Zet	I	79.7	13.4	6.9	Gladstone.
Mersekha	I	84.2	14.3	1.5	do
Qa	I	84.0	13.0	3.0	do
Adu I	VI	77.9 81.7	18.0 16.1	4.1 2.2	do
——	VI	92.3 92.2	3.2 3.9	4.5 3.9	Berthelot.
——	XII	90.5 90.0	4.5	5.0	do
Amenhotep II	XVIII	81.1 83.5	11.4 11.7	7.5 4.8	Gladstone.
Persian Era	—	99.8	—	—	Berthelot.

The specimens analyzed by Mr. Gladstone contained no copper, and Berthelot found no other metal present in his specimens.—Chem. News, Jan. 11, 1901, 13.

Gold-Sodium Chloride—Variations in Price and Gold Content.—Lyman F. Kebler calls attention to the variation in the price of gold-sodium chloride quoted in the lists of different manufacturers. These variations being from $5.90 per oz. to $14.50, it seemed interesting to determine the percentage of gold in them, which, in five samples, was found to be 23.55, 27.22, 25.00, 28.31 and 30.30 per cent. respectively—the last two being labeled *U. S. P.*, which calls for 30 per cent. metallic gold. Moreover, shortage in the quantity of gold-sodium chloride in the 15 grain vials reduced the actual quantity of gold received slightly in all but the fourth sample, which, though deficient grain for grain, contained an excess in actual weight, bringing the actual value received up to a 32.91 per cent. gold basis. The following gravimetric method was found to work well, while the volumetric process proved valueless: Transfer the contents of a 15 grain vial into a 250 Cc. evaporating dish, by means of 100 Cc. of a 1 per cent. solution of pure sulphuric acid. In this mixture dissolve 2 Gm. of pure oxalic acid, then place the dish on a steam bath for two hours or until the reduction of the gold to metal is complete. Decant the clear liquid, wash the gold with distilled water, dry, ignite and weigh.—Amer. Journ. Pharm., July, 1900, 325–327.

PALLADIUM.

Palladium—Formation of a Complex Acid.—The successful formation of a complex acid of palladium by H. Loiseleur is of particular interest, because hitherto no such compound had been obtained with that metal, and, since the experiments of Roessler, palladium was reported to be incapable of forming complex acid. Loiseleur now describes

Pallado-oxalic Acid, together with three of its salts—the silver, sodium, and barium pallado-oxalates. The new acid was obtained in very well formed crystals, whereas the corresponding complex acid of platinum,

Platino-oxalic Acid, was obtained by Soederbaum only in the form of a confused crystalline mass. Contrary to the assumption, therefore, that palladium possessed only in a very slight degree the metalloid characters which platinum shows so decidedly in many of its combinations, the present research shows that this metalloid character is more marked in palladium than in platinum.—Chem. News, Aug. 24, 1900, 94; from Compt. rend., *131*, No. 4, July 23, 1900.

ORGANIC CHEMISTRY.

Hydrocarbons.

Acetylene—Modification of its Technical Purification by Chloride of Lime.—F. B. Ahrens calls attention to the fact that in the process of the technical purification of acetylene with a mixture of chloride of lime and sawdust, besides a small quantity of carbonic acid—which is of no material consequence—variable quantities of chlorinated derivatives are introduced, which constitute a source of danger, while the purifying may become heated spontaneously and thus become useless. He has observed that this heating, and consequently the disengagement of chlorine, does not occur when chloride of lime is used alone. He attributes the heating to a reaction between the hypochlorite and the lignine of the sawdust. The temperature attained by the mass depends on the relative proportions of the chloride of lime, water, and sawdust. On mixing 20 Gm. of chloride of lime with 10 Gm. of sawdust, and 9 Cc. of water, the temperature reaches 130° in seven minutes. The author concludes that sawdust can be replaced by kieselguhr, powdered coke, brick-dust, or chromate of lead. If sawdust is retained, then a very large proportion should be used, with only a small quantity of water.—Chem. News, March 8, 1901, 119; from Zeits. f. Angew. Chem., 1900, 777.

Acetylene—Formation of Crystalline Compounds with Cuprous and Potassium Chloride.—Chaoastelin has shown in a previous paper how, by regulating the current of acetylene through a solution of cuprous chloride and potassium chloride, either yellow or colorless crystals can be obtained, and how the colorless crystals can be transformed into yellow ones. He has since subjected the two kinds to analysis, and finds that the *colorless crystals* correspond to the formula $C_2H_2(Cu_2Cl_2)_2KCl$, whilst the *yellow crystals* contain 2KCl in place of KCl.—Chem. News, July 27, 1900, 48; from Compt. rend., *130*, No. 26.

α and β Naphthol—Distinction by Means of Iodic Acid.—According to

A. Vincent, a solution of α-naphthol gives with iodic acid a yellowish-white precipitate, which quickly develops a violet color. With β-naphthol the same reagent gives a precipitate which gradually becomes red, and on standing becomes red-brown, the liquid assuming a yellow tint.—Pharm. Journ., May 25, 1901, 645; from Repertoire (3), *12*, 216.

Alpha-Naphthol—Superior to Beta-Naphthol in Antiseptic Value.—Maximowitsch states that alpha-naphthol is three times as antiseptic as beta-naphthol, and only one-third as poisonous. Consequently the preference given to beta-naphthol for medicinal use is not well founded. Moreover, beta-naphthol is not so well tolerated by the stomach, and causes irritation of the mucous membrane of the mouth and stomach He prescribes alpha-naphthol in solution in castor oil according to the following formula: Alpha-naphthol, 45 grains; peppermint water, 1 drachm; chloroform, 10 minims; castor-oil, to make 3 ounces.—Pharm. Journ., Nov. 24, 1900, 572; from Therap. Gaz., *24*, 402.

Petroleum—Methods of Deodorization.—The following methods for deodorizing petroleum, benzin, etc., which have given good results, are given in "Pharm. Post" (*33*, 639): (1) Shake 4 liters of petroleum with 100 Gm. zinc chloride, and treat this mixture with quicklime in a close vessel. (2) Shake 4½ liters of benzin with a mixture of ¼ liter H_2SO_4, 1¾ liter H_2O and 30 Gm. $KMnO_4$, allow to stand 24 hours, decant the benzin, again shake with a solution of 7 Gm. $KMnO_4$ and 15 Gm. Na_2CO_3 in 1 liter of water, and decant for use. (3) An odorless preparation is obtained by mixing 100 Kgm. petroleum with 1.5 Kgm. PbO, 9 Kgm. K_2CO_3, and 20 Kgm. water; the petroleum is then shaken with water. This treatment partly decolorizes the product, which may be finally bleached by ozone. The heavier hydrocarbons become darker by treatment with ozone, so they should be decolorized by treatment with reducing agents.

VOLATILE OILS.

Volatile Oils — Classification and Occurrence of Their Constituents.—Prof. Edward Kremers reports a highly interesting and valuable compilation by Florence M. Gage and I. W. Brandel, in which they describe the constituents of volatile oils, mentioning the oils in which they occur, and classifying the latter in accordance with the natural orders to which the oil-yielding plants belong. The compilation is communicated in a serial, beginning with the April number of the Pharmaceutical Review, the subjects embraced by the installments ending according to the prescribed limits of this report with the June number, being the paraffin constituents of the oils obtained from the *Rosacene* (April, pp. 167–171), *Ericaceæ*, *Betulaceæ*, *Turneraceæ*, *Umbelliferæ*, *Labiatæ*, *Rutaceæ*, *Laurineæ*, *Moraceæ* and *Compositæ* (May, pp. 213–217).

Volatile Oils —Relation of Their Ester Content to the Chlorophyll in the

Plants From which They are Derived.—In the course of his investigations on the formation of essential oils in plants, Eugène Charabot confirms his previously recorded opinion that the conversion of the terpenic alcohols into esters takes place chiefly in the green parts, and that the amount of esters thus formed is directly influenced by the physiological activity of the chlorophyll-containing organs. To support this view he cites several observations. Thus, he finds that in the case of peppermint, in which the oils of two varieties of plants were examined, the one from plants with red, the other with green leaves, the latter containing 5.1 per cent. more esters than the former, while the oil of the red leaf mint, on the other hand, was richer in menthone to the extent of 7.3 per cent. Again, in the case of lavender, the nature of the organs of the plants distilled for oil was found to affect the results in a similar direction. Entire plants, and plants deprived of their inflorescences, growing side by side, yielded oils which differed markedly in character, that of the flowerless plants, or in other words from those having the most chlorophyll, gave 3 per cent. more esters than that from the normal crop. In the same manner, altitude, light, hygrometric conditions and temperature, directly as they stimulate the activity of the chlorophyll-containing bodies, so do they influence the increased formation of esters. In this the author confirms the observation of Schimmel & Co., that the oils derived from plants grown in higher altitudes are richer in esters. — Pharm. Journ., Febr. 9, 1901, 135; from Comptes rend., *132*, 159.

Referring to the above paper of Charabot, John C. Umney calls attention to the fact that he had already noted the differences in the constituents of the oils of peppermint distilled from the black and white variety five years ago (see Proceedings, 1896, 561). For many years previous to the publication of his paper he had noted that the oil of white peppermint had a softer and more pleasant taste than the black variety. He found this to be due to a very much higher percentage of esters in the white than in the black variety, the figures then obtained, and since confirmed, being as follows: Black peppermint oil, 3 to 5 per cent.; white peppermint, 12 to 15 per cent. of esters. The view, therefore, of Charabot, that the conversion of terpenic alcohols into esters takes place chiefly in green plants, and that the amount of esters thus formed is directly influenced by the physiological activity of the chlorophyll-containing organs, is thoroughly borne out.—Pharm. Journ., Mar. 23, 1901, 372.

Essential Oils—Adulterations.—Dr. Geo. R. Pancoast and Lyman F. Kebler contribute a lengthy paper in which they interestingly review the entire field of essential oil adulterations. In early times, they say, technical equipments for the production of volatile oils were very incomplete, and various expedients were necessarily resorted to for the purpose of extracting the many odorous principles from the host of plant tissues; fatty products, turpentine and alcohol were frequently employed for this pur-

pose, and consequently there was a certain justification for the presence of some of these solvents in certain essential oils. But modern methods render the use of these foreign substances entirely unnecessary, and they must be looked upon as adulterations pure and simple. The authors then point out some of the many causes and methods for adulterations, comprehensively review the essential tests recommended for determining the purity of, and adulteration in, essential oils, and give a long alphabetically arranged list of essential oils in which the adulterants likely to be found in them are briefly mentioned. The authors, while making little claim for originality, state that their paper contains the results of some years of personal observation, together with information supplied by friends. They have also drawn largely upon existing modern literature, mentioning the principal works that have been consulted.—Amer. Journ. Pharm., January, 1901, 1–10.

Volatile Oils—Method of Quantitative Determination.—Neuman-Wender and Gregor recommend a volumetric process for determining essential oils in drugs and alcoholic solutions, which is based on the complete insolubility of aqueous liquids, and of alcoholic liquids containing less than 50 per cent. of alcohol, in petroleum ether of sp. gr. 0.640 to 0.670. A specially designed flask, shown by Fig. 57, is used for this purpose. It consists of three bulbs; the lower one, *A*, has a capacity of 98 Cc.; the neck connecting the next bulb is 10 Cm. long, and graduated into forty divisions, each corresponding to 0.05 Cc., so that the neck will hold 2 Cc.; the second and third bulbs, *B* and *C*, each have a capacity of 25 Cc. The slightly acidified liquid, at 20° C., is filled into the bulb *A*, and connecting neck to the uppermost mark, so as to make exactly 100 Cc. Then 25 Cc. of petroleum ether at 20° C. is poured in up to the mark 125, the whole shaken for five minutes, and then set aside for several hours, maintaining the temperature at 20° C. during that time. The reduction in volume of the original liquid is then noted and calculated into percentages. For the determination of oils in drugs, the finely-powdered substance is extracted with alcohol of 95 per cent. by two digestions each of five hours. An aliquot part of the alcoholic extraction is then distilled with steam until no opalescence is observed in the distillate, which is then made up to 100 Cc. at exactly 20° C., and treated in the special flask as described. It is of course to be observed that the alcoholic solution of the oil shall not contain more than 50 per cent. absolute alcohol.—Pharm. Journ., Dec. 8, 1900, 666; from Pharm. Post, *33*, 345.

Fig. 57.

Flask for Determining Essential Oils.

Volatile Oils—Possible Value of Viscosity Test.—Edwin Dowzard records some experiments made with the idea that a viscosity test might be advantageously employed, in conjunction with the usual ones, for establishing the identity and purity of volatile oils. By the use of Reischauer's viscometer he established the *Viscosity Standard* as follows: 40 Cc. of water (at 20° C.) is introduced in the inner tube. The time required for 10 Cc. to run is noted = 222 seconds. The sample of oil is treated in exactly the same manner, and the viscosity number calculated as follows:

$$\text{Viscosity number } \frac{O}{W} \times 100.$$

O = oil time in seconds. W = water time in seconds. In this way the viscosity number of pure lemon oil was determined to be 139.6; of citrene, 105.8; of citrene containing 7.5 per cent. citral, 114.9. The viscosity number of several other oils was also determined: Lime oil, 177; bergamot oil, 219.8; orange oil, 112.5; citronella oil, 536; rosemary oil, 320; wintergreen oil, 261; and sassafras oil, 238. The wide differences between these oils seem to indicate the availability of this test for the purposes named.—Trans. Brit. Pharm. Conf., 1900, 516.

Volatile Oils—Color Reaction for Distinction of Various Constituents.—H. Burgess employs a solution of 10 Gm. of mercuric sulphate in 1000 Cc. of sulphuric acid (25 per cent. H_2SO_4) as a reagent for the distinction of citral, citronellal, and other bodies obtainable from volatile oils. For the experiment, 2 Cc. of the substance are shaken with 5 Cc. of the reagent in a small tube, or drops of both are mixed on a white tile. Under these conditions the following characteristic colors are obtained: *Citral*, bright red, rapidly developed on shaking, but fugitive, and leaving white flakes floating in the aqueous portion; *Citronellal*, bright yellow, fairly persistent; *Limonene*, fugitive, pale rose color, passing to white; *Linalyl acetate*, permanent violet color; *Linalool*, immediate deep violet; *Caryophyllene*, yellowish tint without any violet; *Eugenol*, slight violet coloration on standing; *Cinnamic aldehyde*, no reaction; *Terpineol*, flesh color and precipitate; *Cassia oil* forms a yellowish compound which floats on the oil; *Cinnamon oil* gives a brown compound, the aqueous portion colored light violet. After a time the whole is transformed into a solid black mass. —Pharm. Journ., June 15, 1901, 747; from Journ. de Pharm. [6], *13*, 283.

Volatile Oils—Distinctive Color Test for Isomeric Phenols.—A. C. Chapman describes the following test for distinguishing between the phenols of volatile oils: One Cc. of the phenol is dissolved in 5 Cc. of acetic anhydride and then (*a*) a fragment of fused zinc chloride, or (*b*) one drop of concentrated sulphuric acid, is added. The color reactions are as follows:

Eugenol, with H_2SO_4, at first a brown, then purple, and finally a urine-

red color; with zinc chloride, a pale yellow color, disappearing on standing.

Iso-Eugenol, with H_2SO_4, at first a rose-pink, then a light brown color; with zinc chloride, a bright rose-pink.

Safrol, with H_2SO_4, at first a bright emerald-green color, becoming brownish-green, and finally light brown; with zinc chloride, at first a pale blue, fading to light brown.

Iso-Safrol, with H_2SO_4, at first a faint pink color, becoming reddish; with zinc chloride, at first a pink color, then brownish-pink, and finally brown.

Estragol, with H_2SO_4, at first a purple to indigo-blue, then bluish-purple; with zinc chloride, at first a blue-violet color, becoming mauve on standing, and finally brownish.

Anethol, with H_2SO_4, no color at first, then yellowish; with zinc chloride, at first a pale yellow color, slowly deepening to a brick-red.—Pharm. Jour., Jan. 5, 1901, 1; from Analyst, *25*, 313.

Borneol—Purification and Characters.—L. A. Tchongaef finds that the method of fractional distillation usually followed for the separation of borneol and isoborneol, is not efficient, and recommends the following as an efficient alternative: The mixed borneols are dissolved in xylene, and treated with the theoretical amount, or a little less, of metallic sodium, and heated for fifteen to twenty hours. The alcoholate thus formed is then converted into xanthogenic ester, $C_{10}C_{17}.OCS_2.CH_3$. The greater part of the isoborneol remains unaltered, and is removed, as well as the solvent, by distillation in a current of steam, in which any xanthogenic ester of isoborneol which may have formed will be decomposed. When nothing but water distils over, the residual oily body is crystallized by cooling, and purified by recrystallization from alcohol. When pure it melts at 57° C., and has a rotation $[a]_D = -38°$ in toluene solution.—Pharm. Journ., June 22, 1901, 773; from Journ. Soc. Phys. Ch., through Bull Soc. Chim., (3) *26*, 298.

Oil of Bitter Almonds—Identity with the Volatile Oils from Apricot and Peach-kernels.—Referring to the opinion expressed by Pancoast and Kebler in their paper on "Essential Oils," above quoted, that bitter almond oil made from apricot and peach-kernels should not be called genuine, Schimmel & Co. point out that bitter almond oil made from bitter almonds is but rarely met with in the trade, and that, as a matter of fact, there is not the slightest difference between this oil and that made from apricot or peach-kernels.—Schimmel's Rep., April (May), 1901, 9.

Oil of Bitter Almonds—Adulteration with Nitrobenzene.—Ernest J. Parry states that among a large number of samples of oil of bitter almonds examined by him during the last few months, there were quite a number that were adulterated to a very large extent with a highly rectified nitrobenzene —with more or less nitrotoluene. The adulteration is, of course, easy of

detection. The sp. gr. of the adulterated oils varied from 1.143 to 1.187, and they yielded large fractions distilling at from 195° to 215° C. Several samples were observed also which were adulterated with synthetic benzaldehyde, recognized, in most cases, by the presence of small quantities of chlorine.—Chem. and Drugg., April 13, 1901, 588.

Volatile Oil of Buchu—Components.—According to the investigation of Kondakow and Bachtschiew the volatile oil of buchu, when of the best quality, consists of about 10 per cent. of aromatic hydrocarbons, which have a pleasant odor and are a mixture of *limonene* and *dipentene;* of about 60 per cent. of a ketone—*menthene;* of about 20 per cent. of *diosphenol*—melting at 82° C.; of 5 per cent. of resinous matter, and about 6 per cent. of other bodies. The diosphenol content varies, being greater as the specific gravity of the oil increases, and the optical activity decreases.—Pharm. Ztg., Mar. 6, 1901, 194; from Jour. prakt. Chem., 1901, No. 2.

Oil of Cardamom—Distinction in Odor According to Source.—M. W. Allen and E. T. Brewis have examined the oils obtained from Mangalore cardamoms and from the variety known as "Ceylon wild" cardamom, these oils having a widely dissimilar aroma while showing no great differences in their physical properties. The optical rotation of Mangalore oil was − 12° 30, as compared with + 12° 25 for the oil from the "Ceylon wild," while the specific gravities were, respectively, 0.9283 and 0.9102. These figures are intermediate with those obtained with oils distilled from Ceylon Malabars and Ceylon Mysores. Their sp. gr.'s were found by the authors to be the same, viz., 0.9479; their optical rotation, + 30° 50. As there is no official standard for oil of cardamom, it is important that the distinction between that obtained from official cardamom and that from "Ceylon wilds" be noted.—Pharm. Journ., March 16, 1901, 329, 330.

Oil of Cascarilla—Constituents.—G. Feudler has made an exhaustive investigation of the volatile oil obtained by distillation from cascarilla bark (*Croton eluteria*, Bennet) in the laboratories of Schimmel & Co., from the results of which he deduces the following percentage composition: (1) *Free acid*, 2.10 per cent.—consisting of: *cascarillic acid*, 2, *palmitic acid*, 0.08, and *stearic acid*, 0.02 per cent.; (2) *Eugenol*, with traces of *cresol*, 0.30 per cent.; *Terpene*, $C_{10}H_{16}$, boiling at 155°–157°, 10 per cent.; *l-limonen*, 8.80 per cent.; *Cymol*, 13.20 per cent.; *Sesquiterpene*, $C_{15}H_{24}$, boiling at 255°–257°, 10.50 per cent.; *Sesquiterpene*, $C_{15}H_{24}$, boiling at 260°–265°, 33 per cent.: *Alcohol*, $C_{15}H_{23}OH$, 11 per cent.; *Oxygenated bodies*, having high boiling points, 10 per cent.; *Resin*, 1.10 per cent. = 100. The sp. gr. of the oil at 15° was 0.914, and its rotatory activity A_D = −4.81. The principal acid constituent, which has been named

Cascarillic Acid, having the composition $C_{11}H_{20}O_2$, is isomeric with "undecylic acid." It is a liquid having the sp. gr. 0.9324 at 20° and melting, after congelation, at —18°.—Arch. d. Pharm. 1900, No. 9, 671–691.

Oil of Cassia Flowers—β-Ionone a Probable Constituent.—In their October report, 1899, Schimmel & Co. mentioned the fact that they obtained from the volatile oil of the cassia flowers (*Acacia Farnesiana*), prepared from the pomade by extraction with alcohol, a considerable proportion of methyl salicylate. They have since made investigations, as yet incomplete, concerning the other constituents of the oil, and obtained from the higher boiling fraction an impure body, which appears from its reactions and its violet aroma to be a ketone allied to ionone. By further treatment they succeeded in obtaining from this impure body a white prismatic crystalline body, which is considered to be possibly the semi-carbazone of this ketone. This semi-carbazone was eventually obtained of a melting point of 143°, from which, on heating with diluted sulphuric acid, an oil having a strong ionone odor. Considering that β-ionone semi-carbazone melts at about 148°, it is not unlikely that on a closer examination the cassia-ketone will prove to be identical with β-ionone. From the portions of the cassia oil boiling at lower temperatures than the ketone fraction, a mixture of alcohol was isolated in which benzyl alcohol appears to be present. Treatment of this mixture of alcohol with phenylisocyanate produced a urethane melting at 77°, a melting point which did not change when the substance was mixed with benzyl-phenyl-urethane.—Schimmel's Rep., April–May, 1901, 18.

Atlas Cedar Oil—Characters and Constituents.—Schimmel & Co., have had opportunity to examine a specimen of the new cedar wood oil supplied by Professor Trabut who, in a paper quoted in last year's report (see Proceedings, 1900, 667), discussed its therapeutic properties and proposed to distinguish it from other cedar oils by designating it as "Atlas Cedar Oil," being distilled from the wood of the Atlas cedar, *Cedrus atlantica*, Manetti, a variety of *Cedrus libani*, Barr. The oil is a thickish, pale yellow fluid, of balsamic odor. Its sp. gr. is 0.9517, it rotatory power + 48° 16′, and it forms a clear solution with 3 to 4 parts of 90 per cent. alcohol, which becomes slightly cloudy on the addition of more alcohol. After acetylation the saponification number 40.6 was determined, which would correspond to 16.6 per cent. of an alcohol $C_{15}H_{26}O$.—Schimmel's Rep., April/May, 1901, 58.

Chrysanthemum Oil—Physical and Chemical Description.—Perrier has obtained from the green leaves of *Chrysanthemum japonicum* by distillation about 0.16 per cent. of essential oil. Chrysanthemum oil is a greenish liquid, having an aroma slightly resembling chamomile and peppermint; its specific gravity is 0.932 at 15°, and the index of refraction $n_D = 1.4931$ at 18°. It forms a clear solution with 10 parts of 90 per cent. alcohol; when the temperature is reduced to —15° an amorphous paraffin-like substance separates out, and with further refrigeration it becomes solid. The oil commences to boil at 160°; its saponification number is 8.61. From the saponification solution a solid product, resembling angelic acid

in odor, was separated by means of hydrochloric acid.—Schimmel's Rep., Oct., 1900, 15; from Bull. Soc. Chim., III., *23*, 216.

Darwinia Oils—Characters.—R. T. Baker and H. G. Smith have produced and examined the volatile oils obtained from the species of *Darwinia—D. fascicularis*, Rudge, and *D. taxifolia*, A. Cunn—growing in the neighborhood of Port Jackson, N. S. W., and communicated their results to the Royal Society of New South Wales. The yield of oil from

Darwinia fascicularis, Rudge, a shrub of from 2 to 5 feet high, amounted to 0.3 to 0.5 per cent., depending upon the greater or less quantity of woody twigs mixed with the leaves. The pleasantly odorous crude oil is fairly dark colored, and has a sp. gr. of 0.915 at 19°. It is soluble in 2 parts 90 per cent. alcohol, has an optical rotation, a_D + 1.2°, and, what is very interesting, contained between 57 and 65 per cent. of geranyl acetate, together with about 13 per cent. of an alcohol—most probably geraniol—which could be readily esterified. From

Darwinia taxifolia, A. Cunn, the yield is about 0.313 per cent. of an oil which proved to be of less importance. This oil has a fairly light color, and a specific gravity of 0.8734 at 21°. Its optical rotation, a_D, is—6.5°. Saponification number 14.5 to 16. All the oil, excepting about 4 per cent. which boiled at a lower temperature, passed over in the distillation be twean 165 and 255°. The lightest fraction contained l-pinene, which was recognized by its boiling point and its nitrosochloride, melting at 103°. Cineol and phellandrene were not traceable. The alcohol contained in the oil appears to be linalool, judging by the odor of the saponified oil. Acetylation gave values from which a content of 7.9 per cent. of an alcohol of the formula $C_{10}H_{18}O$ could be calculated.

Messrs. Schimmel & Co. have received specimens of both the crude and saponified oil of *Darwinia fascicularis* and have submitted them to a short chemical examination with results which agree fairly well with those obtained by the original investigators.—Schimmel's Rep., Oct., 1900, 19.

Eucalyptus Oils—Description of New Varieties.—Schimmel & Co. have examined two varieties of eucalyptus oils which have not yet been described. They were distilled from (cultivated? Rep.) plants grown on the Eucalyptus plantations of a Portuguese distiller, the one being obtained from *Eucalyptus bicolor*, A. Cunn., the other a variety of *Eucalyptus* called the "*Red Gum of Tenderfield*" (= Tenderfield, New South Wales). Their properties are as follows:

Oil from Eucalyptus bi-color: Specific gravity, 0.8866; optical rotation, a_D = —21° 50′. Insoluble in 70 per cent. alcohol; soluble in 9 parts of 80 per cent. alcohol. It contains much phellandrene, but little cineol, and belongs therefore to the inferior qualities of eucalyptus oil.

Oil from "Red Gum of Tenderfield:" Specific gravity, 0.9144; optical rotation, a_D = —2° 38′. Insoluble in 70 per cent. alcohol; soluble in

equal parts of 80 per cent. alcohol. The oil has an odor like cumic aldehyde, contains cineol, but is free from phellandrene. As these data show, it is on the borders of the class of superior eucalyptus oils, but it cannot replace a normal globulus oil.—Schimmel's Rep., Oct., 1900, 32.

Eucalyptus Oils—Presence of Eudesmic Acid Ester.—In the course of previous investigations (see Proceedings, 1900, 638 and 748), H. G. Smith and R. T. Baker had detected the presence of esters in a number of eucalyptus oils. Mr. Smith has now confirmed the presence of the

Amyl Ester of Eudesmic Acid in certain eucalyptus oils and he considers it probable, from an examination of oils of known origin, that esters, to which characteristic odors are due, are present in all eucalyptus oils. The amyl alcohol reported by Schimmel & Co. as occurring in oil of *E. globulus*, was probably originally derived from this amyl ester, and the inference is that an ester must be present at some time, even in oils which, when distilled, usually consist largely of cineol and pinene. Unfortunately, the yield of oil is small in those species of *Eucalyptus* containing the ester in largest amount; thus the leaves of *E. aggregata* yielded only 0.04 per cent. of oil, but that contained the ester in sufficient quantity to enable it to be isolated and determined. The oils of *E. botryoides* and *E. saligna* contain an ester in fair amount; it is also present in the oil of *E. rostrata* and several other species. It is suggested that the amyl alcohol of the ester is probably connected with the valeraldehyde known to be present in eucalyptus oils, and that the aldehyde resembling cuminaldehyde, which exists in so many of the oils, may have some connection with the acid of the ester. In the oil of *E. rostrata* the ester and the aldehyde resembling cuminaldehyde, which is a much more frequent ingredient of eucalyptus oils than has been supposed, occur together. The aldehyde is not ordinary cuminaldehyde as was previously supposed, but is more aromatic, has a somewhat higher lævo-rotation, a lower specific gravity and boiling point, and its oxime melts at a much higher temperature. The oil of *E. patentinervis* contains a small quantity of an ester, but the odor of that oil is largely due to linalol or geraniol, no less than 16.5 per cent. of free alcohol being present; a small quantity of citral has also been extracted from the oil. The

Oil of Eucalyptus Aggregata ("Black Gum") is described by the author as very fluid, of a light orange color, and an odor bearing but little resemblance to that of ordinary eucalyptus oil. Its specific gravity is high for eucalyptus oil, and on distillation under atmospheric pressure 26 per cent. was obtained, distilling between 156° and 164° C., the distillate being principally dextro-pinene, as proved by its boiling point, formation and character of its nitrosochloride, its odor and other tests. Only 12 per cent. was obtained, distilling between 164° and 245° C., while 22 per cent. distilled between 245° and 292° C.; the remainder was poured from

the still and became semi-crystalline on cooling. The portion adhering to the still was removed by ether. The crystalline residue was reserved for further determination. The specific gravity of the crude oil at 15° C. was 0.956, that of the fraction 156°–164° C. at 15° C. = 0.866, that of the fraction 164°–245° C. = 0.8769, and that of the fraction 245°–292° C.= 0.6868. Specific rotation, fraction 156°–164° C. = $[a]_D$ + 27.13°. Light did not pass with the crude oil. Phellandrene could not be detected in the oil, and cineol also appeared to be quite absent. The principal constituents present are dextro-pinene and the amyl ester of eudesmic acid, with perhaps some polymeric terpenes. The author also describes

Eudesmic Acid.—This is unsaturated, taking up bromine to form a dibromide. It is not a member of the series of fatty acids, and its characters remove it from the acrylic series. Probably it belongs to the series of acids homologous with cinnamic acid. The formula for cumyl-angelic acid is $C_{14}H_{18}O_2$ and the acid has a molecular weight of 218, which approaches very closely the molecular weight found for eudesmic acid. The aldehyde resembling cuminaldehyde, which is frequently found occurring in eucalyptus oils, may have some connection with eudesmic acid.—Pharm. Journ., Oct. 6, 1900, 386; from Journ. Roy. Soc., N. S. W., *34*, 72.

Eucalyptus Oil—Geranyl Acetate an Abundant Constituent of the Oil Obtained from Eucalyptus Macarthuri.—In a paper read before the Royal Society of New South Wales, H. G. Smith shows that the oil of *Eucalyptus macarthuri* is very rich in geranyl, containing 60 per cent. of geranyl acetate, and 10.64 per cent. of free alcohol, calculated as geraniol. The oil is somewhat analogous to that obtained from *Darwinia fascicularis;* but the oil of *E. macarthuri* contains eudesmol, which is absent from the oil of *Darwinia.* The yield of oil from fresh leaves and branchlets of *E. macarthuri,* collected in October from near Wingello, in New South Wales, and subjected to steam distillation, was 0.112 per cent. The whole of the ester was saponified in the cold by alcoholic potash in an hour and a half, As no heat was applied, the separated oil was excellent, the geraniol not being interfered with. It is suggested that cold saponification of geranyl acetate might be resorted to for quantitative determination of that ester, when it and other esters are present in essential oils. Citral was obtained by oxidation, and the pure geraniol prepared from the calcium chloride compound was a colorless oil boiling at 224°–225° C. uncorr.); it had a specific gravity of 0.885 at 20° C. The acid of the ester was shown to be acetic acid. The crude oil contained neither eucalyptol nor phellandrene, and was entirely different in appearance and constituents from ordinary eucalyptus oil. It formed a clear solution with two volumes of 70 per cent. alcohol, it had an optical rotation of + 3.6° in a 100 Mm. tube, and specific gravity at 15° C. of 0.9245, the comparatively high specific gravity being due to the presence of the stearopten.—Chem. News, Jan. 4, 1901, 5.

Oil of Eucalyptus Melliodora—Percentage of Eucalyptol, Specific Gravity, etc.—Referring to the description of volatile oil obtained by Baker and Smith from *Eucalyptus melliodora*, and the high percentnge (58 per cent.) of eucalyptol coupled with a low sp. gr. (0.902) ascertained by them, E. J. Parry records the results of an examination of oil guaranteed to him as having been distilled from the same species of *Eucalyptus*. These show characters that vary from those obtained by Baker and Smith in their oil. It had a sp. gr. of 0.917, an optical rotation of —0° 37′, and contained 52 per cent. of eucalyptol.—Chem. & Drugg., April 13, 1901, 588.

French Bitter Fennel Oil—New Constituent.—In 1897, E. Tardy announced the discovery in French bitter fennel oil of a crystalline compound, which he believed to be a coumarin-like body, but which, probably owing to lack of material, was not subjected to closer examination. When a fairly large quantity of French bitter fennel oil was subjected to fractionation, the chemists of Schimmel & Co. observed that both in the higher fractions and in the residue of the distillation fine crystals separated out, which could readily be freed from the adhering oil by draining and washing with petroleum ether. Re-crystallization from acetic ester yielded the body in almost pure white, broad needles, while from alcohol it was obtained in the form of bold jagged crystals, melting at 164°–165°. This is clearly not Tardy's compound, but another body, of which it is still doubtful to which class it belongs.—Schimmel's Rep., April May, 1901, 13.

Anethol—Synthesis of an Isomer.—Béhal and Tiffeneau obtain *p*-pseudopropenyl-anisol by the action of magnesium-iodo-methyl on anisic ethyl ester. The new body may be distilled with steam, and furnishes crystals which melt at 32° C.; it boils at 222° C., and has an odor resembling that of anethol. A di-compound is formed at the same time, which is not volatilized in a current of steam, is odorless, forms crystals which melt at 58°, and on boiling splits up into a mono-compound.—Pharm. Journ., June 1, 1901, 693; from Compt. rend., *132*, 561.

Anisic Aldehyde.—A sensitive reagent for *Picrotoxin*, which see under "Glucosides and Neutral Principles."

Oil of Galangal—Characters.—Haensel gives the following characters of the oil of galangal root: Sp. gr. at 15° C., 0.9155; rotation, at 20° C., 4.04; refraction index, at 20° C., 1.4782. Refractometer number (Ziess Woolny), at 20° C., 79.9. It dissolves in 6.1 volumes of alcohol 80 per cent., and in 0.22 volumes of 90 per cent. alcohol.—Pharm. Zeit., Jan. 19, 1901, 58.

Galangal Oil—Eugenol a Prominent Constituent.—Heretofore the only constituent of galangal oil that has been identified was cineol, but P. K. Horst has recently examined the oil, and determined it to contain about 25 per cent. of eugenol. The phenol separated by shaking the oil with

soda solution was fractionated, and the portion boiling between 247° and 248° was collected separately. The specific gravity of this fraction was 1.0478 at 24°. The benzoic ester produced from it gave an elementary analysis number corresponding to those of benzoyl eugenol, its melting point being 60° to 70.5°, proving the phenol of galangal to be eugenol.—Schimmel's Rep., April (May), 1901, 35; from Pharm. Ztschr. f. Russl., *39* (1900), 378.

Oil of Geranium—Development of Constituents at Different Stages of Growth.—In continuation of his researches on the development of the constituents of volatile oils in plants at different stages of their growth (see Oils of Peppermint and Lavender, Proceedings 1890, 750 and 751), E. Charabot has observed the evolution of the volatile oil of geranium, comparing the constituents of two specimens of oil derived from plants grown in the same field; the one distilled from green plants on July 18 last year, and the second from another portion of the crop, more developed, but still green, distilled on August 21. As in the case of the other oils, the proportion of esters was found to increase as the plants developed, the amount of total alcohols also slightly increased, while the amount of free alcohols diminished, but less than is equivalent to the increase in the amount of esters, so that in this case, as etherification takes place without dehydration, a small amount of free alcohol is formed. The amount of ketone (menthone) in these two samples showed no very marked difference; but in a third distillation from the same crop in the middle of September, when the plants had attained their full maturity, the amount of ketone was materially increased. Thus, although the ketone (menthone) has no intimate relation to the alcohols gerianol and rhodinol present in the oil, such as the menthone of peppermint oil has to the accompanying menthol, yet it appears in quantity during the period of the greatest respiratory activity of the plant in both cases. It is found also that as the growth of the plant progresses the proportion of rhodinol increases, while the geraniol diminishes. Although not yet proved, it is not improbable that this change may take place in the green parts of the plant, geraniol being converted into rhodinol by the addition of two atoms of hydrogen. In the same way, the menthone is possibly derived by oxidation from the rhodinol thus formed, which may first be converted into rhodinol, and then spontaneously transformed into its isomer lævo-menthone.—Pharm. Journ., Dec. 29, 1900, 753; from Comptes rend., *131*, 806.

Geranium Oil—Average Characters of the Product of the Season at Cannes.—Jeancard and Satie give the following results of their weekly examination of the oils produced during the past season by the distillation of geranium herb at Cannes, the number given being the mean of a number of determinations in each case: Sp. gr. 0.8885 to 0.8996; opt. rot. 9° 46′ to 11° 10′; solubility in alcohol (70 per cent.), from 1 : 1.73 to 1 : 1.98; superficial tension, 2.946 to 2.97; viscosity, 1.18 to 1.25; free

alcohols, 60.15 to 65.09; total alcohols, 66.7 to 72.26: saponification number in the cold, 31.5 to 35.13; saponification number on heating, 49.7 to 54.13; true esters, 5.84 to 6.65 per cent. They find that both neutralization in the cold and complete saponification increase the solubility of the oil, while acetylization decreases it, as might be expected. Since geranium oil from the Cannes district contains less free acid than other varieties, it is, therefore, more soluble. The greater part of the acid appears to be derived from the leaves; distillates from woody portions, leaves and stems gave, respectively, per kilo of material, 1.55, 4.00 and 1.30 Gm. of acid calculated as acetic acid.—Pharm. Jour., June 22, 1901, 773; from Bull. Soc. Chim. [3], *25*, 516.

Oil of Ginger—Isolation of a New Sesquiterpene.—H. von Soden and W. Rojahn have obtained a new sesquiterpene from ginger oil, by fractionating the saponified oil; they have called it "zingiberene" and it has the following constants: optical rotation —69°; specific gravity 0.872 at 15°; under atmospheric pressure it boils, with slight decomposition, at 269 to 270°; at 14 Mm. at 134°; according to a preliminary analysis a sesquiterpene of the formula $C_{15}H_{24}$ is present. The hydrocarbon is a thin liquid, and like all "light" sesquiterpenes, among which it might be classed in view of its low specific gravity, it has a tendency to become resinified. Crystalline products of addition could not be obtained. The absorption of bromine points to two double linkings.—Schimmel's Rep., Oct., 1900, 35; from Pharm. Ztg., 45, 414.

Jasmin Oil—Absence of Indole in the Product Obtained Direct from the Flowers.—In the course of further studies concerning the composition of the volatile oil of jasmine flowers (see Proceedings, 1900, 755), A. Hesse has also examined a jasmine oil, which had been produced by extraction of the flowers with a volatile solvent. The material had been supplied by the "Societé des Parfums Purs" under the name of "Jasmin pur," and its purity was guaranteed by Pillet. It was a pale brown liquid, having a specific gravity of 0.914 at 15° C., and containing 25 per cent. of benzyl acetate. It showed no blue fluorescence, and further examination proved that neither the methyl ester of anthranilic acid, nor indole was present. As, however, according to Hesse's examinations of oil of jasmine flowers obtained from jasmine pomades, such oil contains both indole and the methyl ester of anthranilic acid, the question arises, where do these constituents come from, which are clearly not present in the freshly gathered jasmine flowers? The presence of the methyl ester of anthranilic acid in oil from jasmine pomade is explained by the joint use of orange flowers in the manufacture of pomade from jasmine flowers. The presence of indole in the pomade oil is, in Hesse's opinion (based upon a hypothesis of J. Passy), due to the fact, that in some kinds of flowers the generation of the odoriferous principle continues after the flowers are gathered. This would show that indole is formed in the jas-

mine flower only during the treatment with fat, which lasts for several hours, and that it passes into the fat along with the other constituents of the oil.—Schimmel's Rep., Oct., 1900, 37; from Berichte, *33*, 1585.

Jeancard and Satie also call attention to the fact that

Jasmin Pomade is not a suitable material to form the basis for a study of oil of jasmine. The fat which serves for the manufacture of jasmine pomade is, previous to the addition of the jasmine flowers, boiled down with rose or orange flower water, alum and benzoin being added. In the month of May this fat is further treated with an infusion of orange flowers, after which the enfleurage with jasmine flowers takes place. In this manner substances enter into the pomade which do not originate from the jasmine flower. According to the examinations made by the author, 1 kilo pomade contains 0.05 Gm. benzoin, 0.250 Gm. oil of orange flowers, and 3 Gm. oil of jasmine. By washing the pomade with alcohol, acetone, etc., and after distilling off the solvents, a jasmine oil is finally obtained, which contains about 11 per cent. of substances not properly belonging to oil of jasmine. With a view of obtaining pure jasmine oil by the enfleurage method, Jeancard and Satie have treated pure vaselin with jasmine flowers, without using benzoin or orange flowers, and from the resulting product isolated the oil in the usual manner. The properties of the oil so obtained are tabulated along with the constants of the jasmine oil produced by steam-distillation of jasmine flowers. The saponification number of the oils lies between 103 and 155. The specific gravity is all the higher, according as the saponification number, *i. e.*, the ester-content of the oil, is larger.—Schimmel's Rep., Oct., 1900, 38; from. Bull. Soc. Chim., iii, *23*, 555.

Oil of Jasmin Flowers—Advantage of Enfleurage over Distillation with Volatile Solvents, Constituents, etc.—O. Hesse has repeated his work on oil of jasmin flowers (see Proceedings, 1900, 755) with material against which, he feels confident, no objection can be raised. He arrives at the following conclusions: (1) The enfleurage process with fat yields ten times the amount of oil that is obtained by the extraction with volatile solvents; (2) the properties of the oil from jasmin flowers alone are the same as those of the oil from good commercial pomades; (3) the

Anthranilic Acid Methyl Ester (described in his previous paper, Rep.) is a container in the oil as a normal constituent which appears to be formed during the process of enfleurage. The assay of this ester is accomplished by Hesse and Zeitschel as follows: The oil is dissolved in 2 to 3 parts of dry ether and reduced to a temperature of 0°. A cold mixture of 1 vol. of conc. sulphuric acid and 5 vol. of ether is added drop by drop, under constant stirring, until no further precipitate results. The precipitate is collected on a filter and washed with dry ether until odorless. The amount of combined sulphuric acid may then be determined

by titration with N_2KOH,V.S., phenolphthalein being used as indicator. The ester is then saponified and the amount of ester determined titrimetrically. For the details the original paper must be consulted.—Pharm. Rev., April, 1901, 173 and 175; from Berichte, *34*, 296.

English Lavender Oil—Variation in Specific Gravity of Genuine Oil.—H. J. Henderson calls attention to variations in the specific gravity of English oil of lavender which, if the dictum of the B. P. is accepted—sp. gr. not below 0.885—would lead to the rejection of pure and genuine oils. He has found the specific gravity of genuine oils to vary between 0.883 and 0.893. The age of the oil, however, is also an important factor. An oil distilled by W. Ransom & Son, of Hitchin, in 1899, had a sp. gr. of 0.8846. After this oil had stood in a cool cellar for three months it had a sp. gr. of 0.893, while a sample of the same oil when kept in an open flask on a shelf in the laboratory was found to have a sp. gr. of 0.956, and the delicacy of its perfume had departed. Expert buyers of lavender oil prefer to trust to the nose test as a guide to quality, particularly if it is to be used for perfumery purposes. So far as concerns French oil of lavender, whatever may be its ester content, it lacks the delicate bouquet of the English product.—Pharm. Journ., Nov. 3, 1900, 490.

Oil of Lavender—Coumarin a Normal Constituent.—In the course of an examination, still under way, of lavender oil, in order to obtain information about the portions whose boiling points are high, the chemists of Schimmel & Co. have made the remarkable discovery that coumarin is a normal constituent of oil of lavender. They have convinced themselves that it is not an accidental constituent; for while they first observed and isolated it from French lavender oil, they have been able to demonstrate its presence in oil distilled by themselves from a large parcel of lavender flowers. The whole of the coumarin-content of the flowers appears to pass into the distillate, the flowers remaining after the distillation containing no more.—Schimmel's Rep., Oct., 1900, 40.

Oil of Lavender—Adulteration with Resin.—Several years ago, Schimmel & Co. noted an adulteration of lavender oil with the ethyl ester of succinic acid. They now note an adulteration of a comparatively large parcel of lavender oil supplied by a firm of Grasse, with resin, which had undoubtedly been added on purpose. These samples taken from different bottles of this consignment had the following properties. They had the sp. gr. 0.915–0.916 and 0.916; optical rotation, $a_D = -8° 4'$, $7° 48'$ and $7° 41'$; ester content, 45.8, 45.6 and 45.3 per cent. respectively. All were soluble in 2½ to 3 parts of 70 per cent. alcohol. The cloudy, viscous condition, as well as the unusually high specific gravity, threw doubt on the quality of this oil. Tests for ester of succinic acid gave negative results. Distillation in vacuo produced 12.6 per cent. of a solid hard residue which had the same properties as that obtained from cassia oil adulterated with

colophonium. On evaporating 5 Gm. of each of the oils on a water-bath, a residue was left of from 11.27 to 12.5 per cent. of a brittle hard mass, which gave a saponification number of 142.5. Pure lavender oils of a similar ester-content left only 2.4 per cent. of residue on evaporation. It was therefore proved that resin had been added to the suspected oil. It is not certain whether it was colophonium, which has a saponification number of about 180, or another resin, but this is of no consequence. The alteration in the lavender oil caused by the addition of resin consists principally of an increase in viscosity, specific gravity, and residue on evaporation. Solubility in 70 per cent. alcohol, rotatory power, and ester-content are not much affected by it. It is therefore advisable, if a lavender oil shows a higher specific gravity than 0.895, always to determine the residue on evaporation, by which a possible content of resin can readily and with certainty be detected.—Schimmel's Rep., Oct., 1900, 41.

Sicilian Oil of Lemon—High Rotatory Power and Low Specific Gravity of the Produce of 1900.—Schimmel & Co. call attention to a particularly characteristic property of this year's (1900) crop of Sicilian oil of lemon, which consists in a high rotatory power along with a low specific gravity, the latter reaching the fixed minimum, 0.858, only in some districts and in rare cases. Moreover, the lowest specific gravity is that obtained in oil from districts where the fruit has an exceptionally high oil-content. This is the more to be regretted, as the specific gravity was up to now just one of the factors for detecting the adulteration of the oil with terpenes, a practice carried on at present on such a large scale. A tabulated list of 29 oils from different localities in Sicily shows only seven oils in which the third decimal is 8, while in eleven samples it was 7, in three samples 6, in six samples 5, and in two samples the third decimal was 3—the highest specific gravity found being 0.8588, and the lowest 0.8536. The rotatory power, on the other hand, was found to be higher than the average in previous years. These properties of the 1900 crop of lemon oils are clearly due to a higher content of limonene.—Schimmel's Rep., April, May, 1901, 29.

Oil of Lemon—Characters of Stearoptene.—E. Thenlier states that the so-called *citroptene*, or "lemon oil camphor," is not a homogeneous body, but is mainly composed of two substances both soluble in warm alcohol, but differing in their solubility in cold, the less soluble separating in the form of an amorphous, greasy substance, and the more soluble forming light, silky, well-formed, pale yellow needles, 1 or 1.5 Cm. long, which melt at 145° C. The amorphous substance has no very definite melting-point, softening at 78°, and partly melting at 140° C. This appears not to be homogeneous.—Pharm. Journ., June 22, 1901, 773; from Bull. Soc. Chim. [3], *25*, 465.

Oil of Lemon—Determination of Citral.—Referring to the recommendations by Parry of Tiemann's method for the determination of citral and

citronellal in oil of lemon (see Proceedings 1900, 743), Messrs. Schimmel & Co. give the results of some experiments made to test the accuracy of the method. Using variable mixtures of citral and d-limonene, with and without the addition of citronellal, in the proportions in which they might be looked for in the oil of lemon, they obtained results which, although a little high, gave fairly reliable figures. When trials were made with lemon oils themselves, however, it was found impossible to read the scale with the same degree of accuracy, for the slimy, wax-like parts originating from the peel of the fruit, always present in oil of lemon, are deposited thickly in the neck of the graduated flask in which the experiment is conducted. This makes it impossible to see the dividing zone between the watery and oily layers of liquid, and to read the scale with accuracy. The problem of a useful method for estimating the citral-content of oil of lemon has, therefore, not yet been solved by this process. — Schimmel's Rep., October, 1900, 25.

Limonenol—A New Alcohol from Limonene.—P. Genvresse, repeating with limonene the process which had yielded pinenol from pinene · passing the vapor of nitric peroxide into the terpene kept cool by a freezing mixture—has succeeded in isolating a new alcohol, limonenol, $C_{10}H_{16}O$, a colorless fragrant liquid boiling at 135° C. at 15 Mm., having the sp. gr. 0.9669 at 18° C., and the rotation 19° 21′ at 17° C. It was isolated from the products of the reaction by extraction with a saturated solution of sodium salicylate, as suggested by Duyk. From this it was recovered by distillation. It is a secondary alcohol, and by dehydration gives the ketone limonenone, $C_{10}H_{14}O$, which when treated with hydroxylamine hydrochloride gives the oxime, limonenoxime, $C_{10}H_{14}NOH$, which agrees in all its characters, except in melting point, with the active carvoxime of Wallach.—Pharm. Journ., March 16, 1901, 323; from Comptes rend., *132*, 414.

Citral, Citronellal, Linalol, etc.—Characteristic Color Reactions with Mercuric Sulphate.—H. E. Burgess has obtained well defined color reactions with citral and certain other aromatic compounds of essential oils by means of a reagent obtained by dissolving 10 Gm. mercuric sulphate in sufficient pure 25 per cent. sulphuric acid to make 100 Cc. On adding 5 Cc. of this reagent to 2 Cc. of the oil to be examined and shaking vigorously, any change in color is noted and the examination repeated after the mixture has stood for about ten minutes. *Citral* produces a bright-red color which rapidly disappears, a whitish compound being formed and floating on the surface of the aqueous layer. *Citronellal* gives a bright yellow color, which is more persistent; *limonene*, a very faint flesh color, which vanishes and leaves a white compound; *linalyl acetate*, a brilliant and permanent violet color; *linalol* quickly gives a deep violet color; *eugenol*, a slight violet color on standing for some time; and

terpineol, a flesh color and precipitate.—Pharm. Journ., Oct. 27, 1900, 463; from Analyst, *25*, 266.

Oil of Monarda Fistulosa, L.—Thymoquinone a Constituent.—I. W. Brandel and E. Kremers have determined the presence of two crystalline constituents not hitherto observed in wild bergamot oil (*Monarda fistulosa, L.*), the one, obtained from the phenol portion of the oil, to be reported on later, while the second, from the non-phenol portion, was identified to be

Thymoquinone. This appears to be the first instance in which thymoquinone has been isolated and identified from a volatile oil, and its occurrence is of special interest for several reasons. The substances hitherto identified in wild bergamot oil are cymene, carvacrol and limonene, those identified in the closely-related oil of horsemint (*Monarda punctata*, L.) being cymene, thymol and d-limonene. The relationship of thymoquinone to two of the other constituents of the oil of wild bergamot—cymene and carvacrol—is shown by structural formulas, from which it becomes apparent that carvacrol is a simple oxidation product of cymene, and that

Hydrothymoquinone holds the same relation to carvacrol that this does to cymene. By further oxidation then hydrothymoquinone yields thymoquinone, which, moreover, has been repeatedly prepared by the authors from both thymol and carvacrol. The occurrence of thymoquinone in this oil seems, however, to be of particular significance in relation to the color of the oils, a question which has hitherto received scant attention. In 1885, Liebermann pointed out the ease with which thymoquinone and hydrothymoquinone combine to form the intensely colored

Thymoquinhydrone. If, then, the plant can oxidize either carvacrol or thymol to hydrothymoquinone, or if this diatomic phenol will form in small quantities upon standing, it does not appear difficult to explain the production of dark-colored oils either in the plant, or in the oil upon standing. Under favorable conditions, by a process of "auto-oxidation," the thymoquinone and the hydrothymoquinone may combine to form the intensely colored thymoquinhydrone, not much of which is required to produce coloration of the oils.—Pharm. Rev., May, 1901, 200–203.

Thymol Carbonate.—A New Tænifuge. — J. B. Nagelvoort calls attention to thymol carbonate, which has been introduced by I. F. Pohl, under the name of

Thymotal, as a substitute for thymol when this requires to be administered in large doses, for instance against the parasite *Anchylostomum duodenale*. It is a nearly tasteless, colorless, crystalline compound, melting at 49°, and boiling at 400°. When given internally it is free from the nauseating and intoxicating effects produced by thymol under the same conditions.—Amer. Journ. Pharm., May, 1901, 143.

Oil of Neroli—Estimation of Methyl-Anthranilate in this and Other Oils.—A. Hesse and O. Zeitschel gave details of experiments made with the method, first mentioned by H. Walbaum, for the quantitative estimation of methyl anthranilate in essential oils. The method is based upon the property of this ester to form with sulphuric acid a sulphate which is dissolved only with difficulty by ether, and is found by the author to be available when carried out as follows: The oil to be experimented upon is dissolved in ether, cooled, and mixed with a concentrated (cooled? Rep.) solution of sulphuric acid in ether, when *the whole* of this anthranilate is precipitated in the form of sulphate. The salt thus obtained in water and the quantity of ester contained in it is determined by titration. The authors find oil of orange flowers to contain 0.6 per cent. of methyl anthranilate, against 1.3 per cent. found by Walbaum; but Schimmel & Co. call attention to the fact that Walbaum's work refers to the quantity of raw anthranilic ester obtained, and was not intended to be a quantitative estimation.—Schimmel's Rep., April May, 1900, 41; from Berichte, *34* (1901), 297.

Oils of Neroli and Petitgrain—Influence of Weather and Gathering Time on Yield and Quality.—Jeancard and Satie communicate the results of an interesting investigation of neroli and petitgrain oils, which show that both the weather and the time of harvest have a distinct influence on the yield and quality of these oils, as exhibited in the following tables:

OIL OF NEROLI.

ORIGIN.	Yield per cent.	Sp. Gr.	Rotation.	§Esters per cent.	Date of Distillation.
*Cannes	0.933	0.8746	+4° 16′	14.7	May 14
*Cannet	0.980	0.8746	+4° 30′	12.74	May 14
*Antibes	0.980	0.8726	+4° 40′	10.78	May 14
†Cannet	1.0	0.8701	+4° 32′	15.92	May 16
†Antibes	0.960	0.8749	+3° 13′	17.66	May 16
‡Antibes	0.930	0.8736	+3° 50′	15.43	May 17
‡Cannet	0.880	0.6758	+3° 56′	15.68	May 17
‡Cannet	0.930	0.8736	+4° 58′	14.70	May 17
*Cannes	0.940	0.8756	+3° 20′	16.17	May 18
*Cannet	0.950	0.8742	+4° 42′	14.70	May 18
*Antibes	1.066	0.8716	+4° 30′	13.47	May 18
*Cannet	1.181	0.8739	+5° 5′	14.45	May 19
*Antibes	1.150	0.8723	+4° 20′	13.47	May 19
Maximum	1.181	0.8758	+5° 0′	17.66	
Minimum	0.930	0.8701	+3° 13′	10.78	
Average	0.933	0.8758	+4° 8′	15.19	

* Weather fine. † East wind. ‡ Rain. § Calculated as linalyl acetate.

Oil of Petitgrain.

—	Sp. Gr.	Rotation.	Esters.
Bigarade	0.8946	−5° 19′	50.40
Bigarade	0.8866	−4° 11′	67.84
Bigarade	0.8907	−2° 4	47.14
Bigarade	0.8923	−3° 1	54.16
Lemon	0.8768	+13° 20	12.25
Mandarine	—	+ 6° 14′	46.06

These figures are in agreement with the earlier results of Charabot and Pillet, who in 1898 gave the limits for the ester values as 10 to 20 per cent. for neroli, 50 to 70 per cent. for petitgrain. The yield appears to increase towards the end of May, so long as the weather remains fine. In the case of the rose the reverse is the case, the yield being good only when the day is cool or the weather cloudy. The ester content seems to be independent of both season and weather. It has been suggested that the difference in odor of the orange-flower and neroli oil depends on a certain amount of saponification which takes place during distillation. In order to test this point the authors prepared an alcoholic extract of the flowers, and from this recovered the oil at a low temperature so as to avoid decomposition. This oil had the following characters: Sp. gr. at 20° C., 0.9220; ester per cent., 23.76. The oil had a very different odor from that of neroli. Saponification reduced the percentage of esters to 16.6 per cent. of linalyl acetate. From these and other experiments the authors consider that the normal quantity of ester in oil of neroli as it exists in the flower is at a minimum over 23 per cent., of which 5 or 6 per cent. is decomposed during distillation. A high acidity found in the distilled water is attributed to both fermentation and distillation.—Chem. and Drugg., Nov. 24, 1900, 853; from Bull. Soc. Chim., 1900, 605.

Oil of Nutmeg — Essential Constituents of the "Normal" Distillate. — M. H. Allen and E. T. Brewis, defining a "normal" essential oil as one which represents the bulked distillate obtained from an average parcel of raw material, and containing in full its typical aroma, find that such an oil corresponds more closely with the description and figures of the Germ. Phar., Ed. IV., and with those given by Gildermeister and Hoffmann in their work "The Volatile Oils," than with those given in the B. P., 1885 and 1898. They attribute the difference to the removal of a body, probably Semmler's *myristicin* ($C_{12}H_{14}O_3$), which is contained in the highest boiling fraction of "normal" oil of nutmeg, and has an intense odor of mace. This is probably removed by a process of "fractionation," in order that the oil may correspond to the official requirement, sp. gr. 0.870 to 0.910, solubility in an equal volume of 95 per cent. alcohol, and absence of crystals on cooling the residue of evaporation of a portion of

the oil. The Germ. Phar. gives the sp. gr. 0.890 to 0.930, G. & H. give the limits at 0.865 to 0.920, and state that "when evaporated a small amount of fatty substance, consisting principally of myristic acid, remains behind." The authors, basing their opinion on the results obtained with numerous lots of oil distilled by them, do not agree with G. & H. that the crystalline residue of evaporation is due to myristic acid, but to myristicin, as already stated. The objection which has been made that oil of nutmeg is too highly odorous because of the presence of this body, described as coming over at the end of the distillation, is not regarded as valid. To the contrary, it would permit the use of a smaller quantity to produce a specific flavor.—Pharm. Journ., May 16, 1901, 328–329.

Oil of Sweet Orange—Composition.—According to the investigations of R. Stephan, oil of sweet orange peel contains 96 per cent. of terpene, 1 per cent. of oxygenated compounds, and 3 per cent. of a non-volatile waxy body, melting at 67°–68° C., and probably a difficultly saponifiable ester. The oxygenated portion contains, besides 39.4 per cent. coriandrol, the following constituents which have not previously been recorded: 5.7 per cent. *n*-decyl aldehyde; 8.5 per cent. caprylic ester ($C_{10}H_{17}O.OC_8H_{15}$); 7 per cent. nonyl-alcohol; and 39.4 per cent. dextro-terpineol.—Pharm. Ztg., 46, 110.

Concentrated Orris Oil—A Product of Eight-fold Strength.—Schimmel & Co. call attention to a concentrated oil of orris, eight-fold the strength of the ordinary oil, obtained by removing from the latter nearly all of the large percentage of valueless "myristic acid" (about 85 per cent.) which it is known to contain, the concentrated oil being almost pure "irone" to which the delicate violet odor is due. The new product is liquid at ordinary temperatures, has the sp. gr. 0.93, a rotatory power of + 15°, dissolves in alcohol in all proportions, and also in every other solvent used in practice. Besides possessing a more delicate odor than the ordinary oil, it has the advantage of remaining clear in alcoholic solutions at low temperatures.—Schimmel's Rep., April/May, 1901, 43.

Parsley Oil—Myristicin a Prominent Constituent.—The existence and identity of apiol, $C_{12}H_{14}O_4$, from the oil of the parsley fruit, has been well established by Ciamician and Silber, and other chemists. Mourgues has recently described a second body, "cariol," to which he assigned the formula $C_{11}H_{16}O$, and which he supposed to represent a dimethyl- or ethyl-apiol. But a new examination by C. Bignami and G. Testoni has found this supposition to be incorrect. They operated upon a pale-yellow oil having a specific gravity at 17° of 1.1206. As distillation in vacuo offered no advantages, it was fractionated at atmospheric pressure, when an oil was obtained with a boiling point of 279° to 285°, which was finally collected at intervals of two degrees. The result of the analysis and determination of the methoxyl of the different fractions showed a mixture of

various substances which could not be separated by further fractionating. It was then tried to investigate the character of those compounds by means of oxidation, and this succeeded completely. Treatment with permanganate yielded, as the principal product of reaction, an acid $C_9H_8O_5$ melting point 212°, which is identical with the myristicinic acid of Semmler and the methylene methylgallic acid of Roser. In smaller quantities were obtained: Apiolic acid $C_{10}H_{10}O_6$; tetramethylapionolcarbonic acid, melting point 87°, which readily splits up into tetramethylapionol and carbonic acid; and, finally, trimethylgallic acid $C_{10}H_{12}O_5$ (methylsyringa acid of Körner), which had already been obtained by de Laire and Tiemann in the oxidation of methyl iridol. In brominating the original fraction boiling at 279° to 283°, a bromide melting at 131° to 134° was produced. A bromide which had the same composition, but melted at 162°, was obtained from the oil after boiling it with alcoholic potash solution. The bodies from which these two bromides derive, could not be isolated. In spite of this fact it may be assumed as the result of the examination, that 50 per cent. of oil of parsley consists of a compound which is closely related to Semmler's myristicin. In addition to this, the substances which on oxidation yielded tetramethylapionolcarbonic acid and trimethylgallic acid, must also be present in parsley oil in fairly large quantities.—Schimmel's Rep., Oct., 1900, 47; from Gazz. Chim. Ital., 30, 240.

Apiol—Characteristic Color Reaction.—According to Jorissen, a characteristic color reaction for apiol may be obtained as follows: To a dilute alcoholic solution of apiol, chlorine water is added until the solution becomes turbid, and then several drops of solution of ammonia are added, when a fine red color is developed, which soon disappears. The color is very intense with pure apiol, but is proportionately less marked with adulterated samples.—Pharm. Centralh., Dec. 20, 1900, 785; from Journ. de Pharm. de Liège, Oct., 1900.

Cariol—A Third Constituent of Parsley Oil.—In addition to apiol and apiin, parsley oil has recently been shown by Mourgues to contain a third constituent, which he named *cariol.* The existence of this body is now confirmed by Bignami and Testoni, who find it to constitute 50 per cent. of the oil, and attribute to it the formula, $C_6H_2(OCH_3)(O_2CH_2)C_3H_5$.—Pharm. Ztg., *45*, 606.

Volatile Oil of Poplar Buds—Composition.—F. Fichter and E. Katz have examined the volatile oil of poplar buds. When fractionated at 12–14 Mm. it gave a small portion which appeared to contain the greater part of the fragrant body, a chief fraction boiling between 132° and 137°, and a third fraction boiling between 170° and 200°, which solidified to a butter-like mass on cooling. The second fraction consisted mainly of a sesquiterpene, which was found to be identical with humulene obtained by Chapman from hop oil, giving several derivatives having almost iden-

tical melting points with those of that sesquiterpene. There is also present another sesquiterpene which has not yet been identified. The third fraction was found to contain a mixture of paraffins melting at 53° to 54° C., 57° to 58° C., and 67° to 68° C. respectively. The analytical numbers obtained with these accord with the formula $C_{24}H_{50}$.—Pharm. Journ., Dec. 8, 1900, 647; from Berichte, *32*, 3,183.

Oil of Peppermint—Importance of Proper Refrigeration in Making the Pharmacopœial Menthol Test.—Ferdinand A. Sieker expresses the opinion that the rejection ot oil of peppermint by pharmacists on the ground of dementholization, because of failure in making the oil congeal under the conditions of the pharmacopœial test, may quite often be due to a failure to attain the required low temperature. Samples of American oil so condemned were examined by him, and there was no difficulty experienced to congeal them under the pharmacopœial directions, under which a temperature of —18° to —20° C., is easily attained. The thermometer should be used in such determinations, but it should not be introduced into the freezing mixture but directly into the oil, and the U. S. P. should so direct and define the congealing temperature of the oil. The author furthermore found on rectifying an oil of fair color by steam distillation that about 90 per cent. of colorless could be obtained, leaving about 6.94 per cent. of a darker and thicker oil as residue. The odor of the rectified oil was improved, but it contained about one per cent. less menthol than the crude oil, whilst the residual (6.94 per cent.) darker oil contained a very much higher percentage. The author also points out that on again rectifying the rectified oil with steam a resinous residue remains in the still, showing that a decomposition or polymerization takes place during the process of rectification.—Pharm. Rev., Febr., 1901, 66–67.

Menthol—Purification from Waste Material.—A. W. Gerrard, having in his possession a quantity of impure menthol, the waste of some years of manufacture, attempted its purification by sublimation, and failing to get a satisfactory product, tried crystallization from various solvents—benzene, petroleum ether, carbon disulphide, acetone and methylated ether. Satisfactory crystals could be obtained with all these solvents, but all the solvents except ether left an odor attached to the menthol, which required several days' exposure for complete removal. In the case of the crystals from ether, a few hours' exposure was sufficient to remove all traces of foreign odor. The bulk of the menthol was therefore dissolved in one-half its weight of ether, filtered and crystallized by spontaneous evaporation. The crystals were drained and again crystallized with half their weight of ether. On final removal of the mother liquor, pure menthol was obtained in the beautiful colorless crystals characteristic of that substance. One pound of ether is ample for the two crystallizations of one pound of menthol.—Trans. Brit. Pharm. Conf., 1900, 438.

Bulgarian Otto of Rose—Typical and Special Products.—In the "Chem-

ist and Druggist," July 28, 1900, an exceedingly interesting description of the different types of Bulgarian otto of rose, gathered from the magnificent exhibit of Messrs. Shipkoff & Co., at the Paris Exhibition is given. This exhibit, probably of a thousand ounces in all, embraced more than one hundred samples of otto of rose, all of which were of different origin, each having some characteristic of its own, and representing every rose district in the Balkans. Moreover, every sample was distilled according to special instruction, and in nearly every case under the personal supervision of Mr. Theodore Shipkoff, who was thus enabled to guarantee the authenticity of every sample. Six of the specimens represent the bulk of otto of roses exported during the last few years. Twenty-nine of the samples, representing as many different types, were produced in the chief canton of Bulgaria, namely *Kisanlik*, and these may broadly be divided into three types — those grown north of the Kisanlik Valley, at the foot of the southern chain of the Balkans (Kisanlik, Shipka and Imitli); those grown at the foot of the Little Balkans (Svedna-Gora); and those grown in the valley toward the east (Tonlovo). These oils in general possess the following characteristics: The congealing-point varies from 19°–21° C., and the sp. gr. from 0.848 to 0.855. These variations are, of course, in the main dependent on the quality of stearoptene present, which varies according to the number of white roses mixed with the red during distillation. The optical rotation varies from — 2° 48′ to — 3° 30.′ Next, an oil of quite characteristic aroma and exceptionally fine quality is produced in moderate quantities in seven districts of the easterly canton of *Nova Zagora*. The congealing-point of this type is fairly high, usually about 21°, with a sp. gr. 0.845–0.853, and rotation —3° to —3° 30′. Then, nine villages in the southeasterly canton of *Stara Zagora* produce an exceptionally rich otto, the congealing-point of which is lower than that of the otto produced north of the Little Balkans, varying from 18°–20°. The sp. gr. is correspondingly higher — from 0.850 to 0.855 — which points to a smaller proportion of white roses being distilled; and the optical rotation is —2° 30′ to —3° 12′. The oil produced in five villages in the western canton of *Tchirpan*, agrees pretty closely with the preceding, as does also the otto produced in nine villages of the canton of *Brezova*, which is very fine indeed, the general characters of these two types being as follows: The congealing-point is from 18°–20°, the sp. gr. from 0.852 to 0.857, and the rotation from —2° 30′ —3° 12′. The north-western canton of *Karlova* produces a large quantity of otto from no less than twenty-two localities, which is, however, not constant in quality, the latter depending apparently on the situation of the villages, those on high ground producing fine otto, those on low ground a quite ordinary quality. The general physical characters of these ottos are: sp. gr., 0.853 to 0.858; congealing-point, 17.5°–20°; rotation, 2°30′ to 3°. Other localities producing otto of rose of high class are the canton of *Staro-Nevo-Selo*, and

the mountain district to the southwest of Philipopoli, in the canton of Peshteva. Finally, four specially interesting samples are described:

(1) *Green Otto of Rose*, distilled by a single operation in the same manner as that followed at Grasse, instead of by a number of distillations of water, followed in Bulgaria.

(2) *Otto of Rose from White Roses* exclusively, having a very fine characteristic odor, but containing an abnormal quantity of stearoptene.

(3) *Otto of Red Rose from the Petals* exclusively, all green parts having been removed previous to the distillation, of an extremely delicate odor.

(4) *Otto from the Green Parts of the Flower only.*

Otto of White Roses—Characters and Influence of its Admixture with the Oil of Red Roses.—Referring to the otto of rose exhibited by Messrs. Shipkoff & Co. (see before), Ernest J. Parry mentions that he spent considerable time in this exhibit, and calls attention to a number of samples presented to him and selected because they were of more than usual interest. Among these was a sample of the otto of rose, already referred to, distilled entirely from white roses, without admixture with a single red rose. This was produced by Mr. Shipkoff personally, and he was good enough to place about an ounce at Mr. Parry's disposal. The chief characteristic of this otto is the high amount of stearoptene present. This is at once reflected in the congealing point and sp. gr. Its congealing point is 23.5° to 24° (the pharmacopœial limits are 19.4°–22.2°); sp. gr. at 30°, correspondingly low, 0.8482 (pharmacopœial limits, 0.856–0.860); optical rotation for 100 Mm. 2° 21′; saponification value (per cent. KOH) 0.9. This otto has a very fine odor, and of its purity he is absolutely convinced. The chief point to which the author wishes to draw attention is the fact that whatever may be the limits in physical characters of otto of rose distilled from *Rosa damascena*, whether these are covered fairly by the British Pharmacopœia or not, these limits are materially altered by admixture with much otto from the white rose. Many districts grow white roses to a far greater excess than other districts. Hence the ottos from the various villages have their own peculiar characteristics. The aroma of certain ottos is such that after a very small amount of practice an expert nose can locate an otto by its odor. Four typical samples of otto of rose, specially selected from individual districts where a larger amount than usual of white roses are distilled, gave the following figures:

	Congealing-point.	Sp. gr. at 30°.	Rotation.	Saponification.
1	22.5°	0.8540	—2° 46′	0.81 per cent.
2	22°	0.8509	—2° 37′	0.76 "
3	22°	0.8505	—2° 46′	0.78 "
4	21.5°	0.8518	—3° 10′	0.90 "

These results point out to the author the necessity of altering the B. P. limits for oil of rose, since these four oils, although of exceptionally fine odor and of authentic origin, are clearly outside of the pharmacopœial limits.—Chem. & Drugg., July 28, 1900, 125.

German Oil of Rose—Normal Phenyl-Ethyl Alcohol a Constituent.—Schimmel & Co. state that a few years ago already they had observed that in the manufacture of oil of rose a residue of a rose-like odor remained behind in the extracted rose-mass, which could be extracted with ether, in the form of a heavy aromatic oil. The same oil could also be obtained by extracting dried rose leaves with ether, and a close examination showed that it consisted for the greater part of

Normal Phenyl-Ethyl Alcohol.—The boiling point of this alcohol was 221° to 222° at 743 Mm. On oxidation, benzoic acid, having a melting point of 122° to 123°, was produced, together with phenyl acetic acid melting at 77°. When combined with phenyl-isocyanate it formed the phenyl-methane of phenyl ethyl alcohol, melting at 80°. They found, furthermore, that the extract from fresh rose leaves contained an essential oil which consists largely of phenyl ethyl alcohol and yielded the same methane melting at 80°. They have now made a thorough examination of German rose oil, in the course of which 11 kilos of the oil were worked up, and confirmed the presence of the alcohol in it, as well as normal nonylic aldehyde, and they announce that so far the following constituents besides geraniol have been determined by them in the German rose oil produced in their laboratories: (1) Normal Nonylic aldehyde; (2) Citral; (3) l-Linalool; (4) Normal Phenyl-Ethyl Alcohol; (5) l-Citronellol. Furthermore, they note that this does not complete the list of constituents of German rose oil, which will be the subject of further research.—Schimmel's Rep., Oct., 1900, 53–55.

Since the foregoing note of Schimmel & Co., a detailed examination of rose oil and rose extract made in their laboratory has been made by H. Walbaum and K. Stephan and published in "Berichte" (*33*, 2299 and 2302). These investigations have shown, among other results, that German rose oil contains but very small quantities of phenyl-ethyl alcohol, whilst extraction oils contain it in large quantities. The cause of this difference is an open question, which may be cleared up by further investigation now under way: In the meantime, H. v. Soden and W. Rojahn have published a treatise (Ibid., 3063) in which they state their belief that the low content of phenyl ethyl alcohol in distilled oil can only be attributed to loss during the distillation process, in consequence of the solubility of the alcohol in water—an assumption which the chemists of Schimmel & Co. propose to investigate by further experiments. V. Soden and Rojahn have also examined

French Rose Pomade for phenyl-ethyl alcohol, and found that 45.5 per

cent. of the volatile oil from this pomade consists of that alcohol. They also found 25 per cent. of the same alcohol in the volatile oil from a product extracted by L. Pillet from fresh flowers with a volatile solvent, and known as "Rose pure." In Bulgarian rose oil they found barely one per cent. of this alcohol.—Schimmel's Rep., April/May, 1901, 49.

Oil of Rose—Artificial Production.—The chemists of Schimmel & Co. having succeeded in determining a complete series of the component parts of oil of rose (see German Oil of Rose) this firm has now endeavored the preparation of an artificial oil with such success that they have been able to market a product that, in their estimation, bids fair to find favor with perfumers and others as a substitute for the genuine oil. See Schimmel's Report, Oct., 1900, 56, and April/May, 1901, 51.

Oil of Rose—Chemical Constituents.—According to Thoms, the volatile oil of *Ruta graveolens*, L., is free from terpene, its chief constituent being normal methylnonylketone, $CH_3CO(CH_2)_8CH_3$. Further, there is approximately 5 per cent. of another ketone not hitherto observed, which the author finds to be normal methylheptylketone, $CH_3CO(CH_2)_6CH_3$. The author could not confirm the existence of the compound $C_{12}H_{14}O$ which Williams has reported, nor the laurinaldehyde of the same worker, but he found free fatty acids and a phenol which he has not yet investigated.—Pharm. Ztg., Febr. 6, 1901, 110.

Oils of Sandalwood, Lavender and Thyme—Commercial Quality.—Introducing the subject of numerous physical and chemical examinations of the oils of sandalwood, lavender and thyme made during the past year, Lyman F. Kebler calls attention to the importance of considering the possible influences of the natural conditions under which the plant has been grown from which the oil is derived, the methods of distillation employed, etc., before passing judgment on the quality of the oil. He observes that we are coming more and more to determine the value of an oil by the amount of the most essential constituent contained in it; but in order to differentiate between good and poor oils, the nasal organ as well as physical and chemical methods must be resorted to—a well-trained and experienced nose being probably very difficult to dispense with in selecting oils for certain kinds of preparations. Thus in the case of certain oils we are told that an oil containing from 25 to 30 per cent. of an ester is superior to an oil containing from 35 to 40 per cent. or over, and in the instance of some of the celebrated English lavender oils, these contain but a low percentage of ester, which would indicate that an ester is not the only factor to be considered in selecting an oil. The author considers it probable that among volatile oils,

Oil of Sandal Wood is looked on with more suspicion than any other; yet his experience has been that reliable manufacturers handle the genuine article, a fact which is accentuated by the results shown in the following table:

No.	Specific Gravity. 15° C.	Specific Gravity. 25° C.	Per Cent. of Santalol.	Optical Rotation.	Solubility in 70 Per Cent. Alcohol.	Per Cent. of Santalol-Esters.
1	0.9767	0.9724	97.16	—17° 15′	1 in 5	3.06
2	0.9727	0.9707	93.64	—18° 16′	"	4.10
3	0.9747	0.9739	91.70	—14° 56′	"	2.93
4	0.9666	0.9601	90.12	——	"	1.48
5	0.9716	0.9685	90.87	—17° 2′	"	1.43
6	0.9626	0.9600	75.00	— 7° 4′	"	2.67
7	0.9721	0.9681	96.34	—16° 36′	"	——
8	0.9713	0.9678	94.53	—16° 56′	"	3.61
9	0.9734	0.9696	90.87	—13° 48′	1 in 5½	——

Number 1 was distilled by the author, the yield being 5.5 per cent. Number 6 is undoubtedly adulterated, while numbers 3, 4 and 9 fall below the standard, but must be regarded rather as secondary in quality than adulterated—the standard physical and chemical constants of the genuine oil being as follows: Sp. gr. at 15° C., 0.97 to 0.978; solubility in 70 per cent. alcohol, one in five volumes; optical rotation, —17° to 19° at 25° C. in 100 Mm. tube; santalol, at least 90 per cent. An examination of four samples of

Oil of Lavender gave the following results:

No.	Specific Gravity at 15° C.	Solubility in 10 per cent. alcohol.	Optical Rotation.	Per cent. of Ester.
1	0.8985	1 in 3	—6° 6′	25.70
2	0.8989	1 in 3	—2° 54′	34.36
3	0.8892	1 in 3	—5° 9′	31.42
4	0.8830	1 in 3	—3° 41′	28.29

These samples all represent oils of good quality. The statement of Gildermeister and Hoffmann that an oil of lavender containing less than 30 per cent. of esters is considered by the authors too sweeping, because it is well known that unadulterated oil of lavender is met with, ranking extremely high in quality, yet containing as low as 10 per cent. of esters. As regards

Oil of Thyme, there appears to be little that is genuine on the market, although genuine oil can be obtained if desired. Most of it seems to be adulterated with oil of turpentine, and this is especially true of the "white oil," which seldom contains more than 5 per cent. of phenol bodies, while genuine oil has a phenol content of from 20 to 30 per cent. Twelve samples examined gave the following results:

No.	Kind.	Sp. Gr. at 15°.	Solubilities in 80 per cent. alcohol.	Per cent. of phenol bodies.	Optical Rotation.
1	White.	0.877	Insoluble in 20 volumes.	2.55	
2	"	0.881	" " 20 "	4.26	
3	"	0.863	" " 10 "	None.	
4	"	0.8964	Soluble " 2 "	4.	
5	"	0.8935	Insoluble " 10 "	27.	
6	Red.	0.907	Soluble " 2 "	25.56	
7	"	0.880	Insoluble " 10 "	8.73	
8	"	0.893	" " 10 "	18.81	
9	"	0.916	Soluble " 1¾ "	30.16	
10	"	0.9251	Insoluble " 10 "	19.00	
11	"	0.9084	Soluble " 2 "	14.00	
12	"	0.9074	" " 2 "	24.00	

The genuiue oil should have a sp. gr. of 0.9000 to 0.935 at 15° C., and should be soluble in from 1 to 2 volumes of 80 per cent. alcohol. Samples Nos. 4, and 5 and 10, must therefore be regarded as paradoxical, No. 4 possessing the necessary solubility while very deficient in phenols, while the other two, although containing large percentages of phenols, are insoluble in as much as 10 volumes of the alcohol.—Amer. Journ. Pharm., May, 1900, 223–227.

Santal Oil—Constituents.—Ernest J. Parry has continued the investigation of the constitueuts of oil of santalwood. He finds that the so-called

Santalol, which he had previously shown to exist to the extent of about 90 per cent. in santal-wood oil, is a mixture of two, and possibly more, bodies of an alcoholic nature. This result is in agreement with that of all the chemists who have investigated the oil since the author had pointed out that the main constituents were of an alcoholic nature and not aldehydes as previously maintained by Chapoteaut. Following the fractionation process of Haller, the author finally separated two chief fractions, one boiling at 112° to 160°, the other at 160° to 205°. Fraction *1*, which was very small, had the sp. gr. 0.930, optical rotation —24°30′, and when rectified from metallic sodium, these figures were reduced to 0.919 and —22°15′, respectively. It is doubtless the hydrocarbon (or hydrocarbons) announced by Soden under the name *Santalene,* Fraction *2* consisted evidently of a number of alcohols, but the author has not been able to isolate a single individual body from it in a state of purity. It is a pale yellow oil, sp. gr. 0.981, and has the optical rotation —27°10′. He furthermore expresses the opinion that neither Guebert's, Schimmel's, or Soden and Mueller's results can be said to have shown what are the characters of any pure chemical compound from this alcoholic mixture.—Trans. Brit. Pharm. Conf., 1900, 314–316.

Santal Oil—Constituents.—In continuation of his investigation of the

constituents of santal oil (see Proceedings, 1900, 750), Guebert finds that both alpha- and beta-santalene combine but slowly with glacial acetic acid when heated in sealed tubes. The hydrochlorides of both santalenes have an optical rotation in an opposite direction to the original sesquiterpenes, that of alpha-santalene hydrochloride being + 6° 1′, and that of beta-santalene hydrochloride + 8°. Alpha-santalene gives only one crystalline nitroso-chloride, $C_{15}H_{24}NOCl$, melting at 122°, and insoluble in alcohol. Beta-santalene gives two isomeric nitroso-chlorides, both of which are soluble in alcohol. These are separated from each other by fractional crystallization from alcohol, 95 per cent., in which their solubility differs. The less soluble isomer melts at 101° C., the more soluble form at 106° C. The two santalols, isolated together from the other constituents of the oil as acid phthalic esters, are only separated from each other after saponification, with difficulty, by fractional distillation under reduced pressure. Thus obtained alpha-santalol boils at 300°–301° C., has a density of 0.9854 at 0° C., and the rotation —1° 20′. Beta-santalol boils at 309°–310° C., has the density 0.9868 at 0° C., and the rotation —56°. Dehydrating agents such as acid potassium sulphate or phosphoric anhydride remove a molecule of water from these alcohols, converting them into their respective isosantalenes, $C_{15}H_{24}$. Alpha-isosantalene boils at 255°–256° C. and is very slightly dextrogyre, + 0° 2′, the beta form is more active, + 6° 1′, and boils at a slightly higher temperature, 259°–260° C. The author corrects an error in his former communication, the sp. gr. of the original oil employed being previously given as 0.9684 at 0° C. (P. J. [4], *10*, 496), is now stated to be 0.9871 at that temperature.—Pharm. Journ., Aug. 4, 1900, 161 ; from Journ. Pharm. Chim. [6], *11*, 595.

East Indian Santal Oil—Isolation of a New Terpene. — In the course of an investigation of santal oil, F. Müller has isolated a new terpene, which he names

Santene (C_9H_{14}). This has the sp. gr. 0.871, and boils between 139°–140° C. It forms two polymeric crystalline nitrosochlorides, one blue and the other colorless. It also gives a solid hydrochloride melting at about 80° C. This terpene is probably derived during distillation from teresantalic acid, since when that acid is heated under a reflux condenser, CO_2 is found to be given off, and, on distilling, santene is obtained. A ketone, which the author has named

Santalone ($C_{11}H_{16}O$), has also been obtained by him. It is isomeric with jasmone, and boils at 214° to 215° C. — Arch. d. Pharm., *238* (July 25, 1900), 366–382.

West Indian Sandal-Wood Oil—Characters of Certain Constituents.— H. von Soden and W. Rojahn have investigated the constituent previously isolated by von Soden from West Indian Sandal-wood oil, and named

Amyrol. They have determined that amyrol, like santalol, is not a uniform body, but that by fractionation it can be separated into several alco-

hols. One of these, having the higher boiling point (299°), is a viscous liquid, and has a faint, characteristic, fragrant odor, the sp. gr. being about 0.987, and the optical rotation about + 36°. It has the composition $C_{15}H_{25}OH$, and splits off a sesquiterpene, $C_{15}H_{24}$, with mineral acids or other substances that split off water. Another alcohol, having a lower boiling point, is optically inactive, and apparently has the composition corresponding to the formula $C_{13}H_{23}OH$. The liquor obtained in saponifying the original oil, when acidified with sulphuric acid, yields an oil which partly congeals in crystals and has an odor reminding of acetic acid, the latter being removed by shaking with sodium carbonate solution. The crystals, when recrystallized from methyl alcohol, constitute a new body to which the name

Amyrolin has been given. It melts at 117°, has the composition $C_{14}H_{12}O_3$, and from its behavior is believed to be a lactone-like body, belonging to the aromatic series.—Pharm. Ztg., Nov. 14, 1900, 878.

Santalenic Acid—An Oxidation Product of Oil of Santal-wood.—A. C. Chapman has prepared a crystalline body, santalenic acid, $C_{13}H_{19}O_2$, by the oxidation of oil of santal wood with a neutral aqueous solution of potassium permanganate. It crystallizes from dilute alcohol in transparent plates possessing a brilliant pearly lustre, is insoluble in water, but dissolves readily in all the ordinary organic solvents. It melts at 76°, boils without decomposition at 189° (corr.) under a pressure of 28 Mm., and distils with steam. The rotation of the acid has been determined and gives $[a]_D = + 18°05$. Many of its salts have been prepared and analyzed. The methyl ester is an oily liquid boiling at 232°–234° (35 Mm.), and has a sp. gr. = 1.0132 at 15°/15°. In a 100 Mm. tube at 20° it produces a rotation of —18° 13′.—Pharm. Journ., Dec. 22, 1900, 723; from Proc. Chem. Soc., *16*, 204.

Oil of Turpentine—B. P. Requirement of Solubility in Glacial Acetic Acid.—Wm. Duncan observes that the addition in the B. P., 1898, to the description of oil of turpentine that "It is soluble in its own volume of glacial acetic acid," has apparantly been taken from the U. S. Pharmacopœia. Squire formerly, in the 'Companion,' gave the solubility as one in three, but now repeats the official statement without comment. The English market is chiefly supplied with the American oil, but French and Russian are occasionally found. All closely resemble each other, but are not identical either chemically or physically, and quite possibly behave differently to this solvent. The question arises, is an oil that is not soluble to this extent to be condemned? Of eight different samples tested by the author, only two answered to this test, the others being soluble in from 1 in 3 to 1 in 5 volumes. The author expresses the opinion that if the oil answers the other characters and tests we should not condemn a sample merely on its solubility in glacial acetic acid until we know more about the composition of the various oils. That is to say, an oil not soluble to this

extent may be genuine oil of turpentine though not oil of turpentine of the Pharmacopœia. Care must be taken to see that the acetic acid is up to standard, as any water interferes greatly with the test.—Pharm. Journ., Mar. 23, 1901, 387.

Terebene, B. P.—Satisfactory Preparation from American Oil of Turpentine.—Chas. T. Tyrer and Alfred Westheimer have reviewed the literature concerning the oils of turpentine of American, French, and Russian origin and the terebenes prepared from them, have made a careful physical examination of the different oils, as well as of their terebenes, and of cymol (metamethylpropylbenzene), cymol from camphor, cymol from oil of cumin, and pinene, and have prepared and examined the terebenes from American and French oils of turpentine, with results exhibited in numerous tables. From these results they are inclined to doubt the existence under ordinary conditions of manufacture of a distinct inactive modification of the constituents of *American* oil of turpentine, and hence of terebene, from such oil. From their experience in the manufacture of terebene on a technical scale from American oil of turpentine, however, they find that with due and careful attention to the conditions of temperature, time, and addition, precautions to prevent oxidation, the requirements of the B. P. can be reasonably complied with, with the exception that a certain latitude should be extended. Under the most careful conditions they find that, based on the average of many batches, 5 per cent. distils at over 180°, but that not more than a trace of this should be viscid. They, moreover, do not attribute this trace of viscid matter to the presence of resin in the fresh oil of turpentine, but to subsequent oxidation, partly due to heat used in the examination. They are, furthermore, inclined to suggest the deletion of the test allowing 15 per cent. of distillate under 165°, and substitution for this "not more than 5 per cent. should distil below 160°." They also suggest as a definition of terebene *a mixture of polymerides and isomerides of the empyrical formula* $C_{10}H_{16}$, *together with small quantities of oxidation products, formed by the action of sulphuric acid on oil of turpentine.*

When dealing with *French* oil of turpentine, however, quite a different state of conditions prevails. This oil shows a high laevo-rotation. As in the case of the American oil, the higher the boiling point the lower the rotation, compared to the initial rotation, and the higher the specific gravity. The French oil has a greater tendency to oxidize than the American, being intermediate between the latter and the Russian oil. Terebene obtained from French oil showed no optical activity, but on fractionating, the fractions, with the exception of that passing between 163° and 167°, amounting to 28 per cent. exhibited dextrorotatory power, ranging from 0.8 to 1.4. Furthermore, compared with the yield of terebene from American oil, that formed from the French gives a very small product on distillation with ordinary steam, pointing out that the Continental practice

must be to use highly superheated or ordinary distillation. Finally, the authors observe that the directions commonly given for making "terebene"—that is, by acting on oil of turpentine with sulphuric acid till optically inactive—are not feasible if the American oil be used; with the French oil, however, these conditions are possible, and much confusion would have been saved by definite instructions as to which oil to use.—Trans. Brit. Pharm. Conf., 1900, 468–480.

Camphane—Preparation and Properties.—By the reduction of pinene hydrochloride dissolved in acetic acid by means of zinc dust and hydriodic acid, O. Aschan has prepared *camphane*, $C_{10}H_{18}$. By distillation with steam, the camphane solidifies in the condenser, and may be purified by recrystallization from boiling methyl alcohol, when it forms regular six-sided crystals which melt at 153°–154° C., and boil at about 166° C. A 10 per cent. alcoholic solution is optically inactive.—Pharm. Journ., Aug. 18, 1900, 314; from Berichte, *33*, 100.

Oil of Verbena—Chemical Composition.—Kerschbaum finds that French verbena oil, produced in the Grasse district, contains 26 per cent. of citral and 74 per cent. of terpenes and alcohols. The citral, similar to that described by Tiemann and the author as occurring in lemon grass oil, is composed of two stereochemical forms, yielding two semicarbazones with different melting points; the one melting at 164° C. being derived from "citral A," the other, melting at 171° C., resulting from "citral B." From 80 to 83 per cent. of verbena oil citral is "citral B." Spanish verbena oil differs in composition from the above. It contains only 13 per cent. of citral, 1 per cent. of a new ketone, verbenone, which is not present in the French oil, and 86 per cent. of alcohols and terpenes. Verbenone is described as a colorless oil having a camphoraceous or peppermint-like odor; it boils at 103° C. to 104° C., at 16 Mm. pressure, and is strongly dextrogyre, + 66°. The Spanish oil yielding it had the sp. gr. 0.926 at 17° C. and the rotation + 2° 45′, as compared with sp. gr. 0.903 and rotation —12° 30′ of the French oil examined.—Pharm. Journ., April 27, 1901, 517; from Berichte, *32*, 885.

Vitiver Oil—Comparison of the Product from Dry and from Fresh Roots.—E. Thenlier has compared vitiver oil distilled from the dry imported Bombay roots of *Andropogon muricatus* with the oil distilled from the fresh material in Bourbon. The oil from the dry roots had the following characters: Sp. gr. at 16° C., 1.0115; optical rotation (calculated from a 20 per cent. solution in alcohol), + 35° 10′ at 20° C.; solubility in alcohol (80 per cent.) 1 : 1.5; free acid number by cold titration, 32.48; ester number, 11.92. Distillation commenced at 146° C. under 25 Mm. pressure, and rose in fractions to 210° C. The Bourbon distilled oil was less viscous and the odor not so powerful as that of the oil from the dry roots. Its sp. gr. was at 14° C. 0.9905; optical rotation (calculated from a 20

per cent. alcoholic solution), $-28°$ at 20° C.; solubility in alcohol (80 per cent.), 1 : 1.5; free acid number by cold titration, 6.16; ester number, 12.12; distillation commences under 25 Mm. pressure at 144° C., and is completed at 185° C. From a comparison of the characters of the fractions obtained, and their acid and ester numbers, the author concludes that the observed differences in the two oils are due to oxidation products in that distilled from dried roots.—Pharm. Journ., June 22, 1901, 773; from Bull. Soc. Chim, [3], *25*, 454.

Concrete Perfumes—Manufacture.—In a paper on the manufacture of perfumes, O. B. Salisbury gives a description, illustrated by a drawing, of the modern process of extracting perfumes, which are supplied in the concrete or solid state. In this process the perfume is extracted economically and completely by such solvents as carbon disulphide, acetone, or petroleum ether, which are afterwards completely removed, leaving a concrete perfume of great purity and of such strength that one pound advantageously replaces one hundred pounds of pomade obtained by the older enfleurage process. The author also describes, with suitable illustrations, the older process of enfleurage, the method of extracting the pomade obtained by the process, and gives interesting statistics respecting the cultivation of flowers and the manufacture of perfumes from them.—Merck's Report, July, 1900, 304–306.

ALCOHOLS AND DERIVATIVES.

Alcohol—Color Reaction with Cobalt Chloride and Potassium Sulphocyanate.—It is stated in L'Union Pharm. (*42*, 52) that when a solution of potassium sulphocyanate is added to a solution of cobalt chloride no marked change of color takes place; but if to the mixture a solution containing alcohol be now added, by means of a pipette, in such a manner that the two liquids do not mix, a fine turquoise blue color appears in the upper layer, and is most pronounced at the point of juncture of the two liquids. The presence of nickel does not interfere with the result unless it is present in a much greater amount than the cobalt.—Pharm. Journ., June 15, 1901, 747.

Alcohol—Unsuitability of Metallic Containers.—In view of the common practice of storing alcohol in metallic vessels, Malmejac has instituted a series of experiments to determine the action of that liquid on copper, iron, tin, zinc, lead and galvanized iron. Alcohol (95 per cent.), left in contact with these metals for six months, gave, in all cases except that of copper, a marked residue when a portion was evaporated. Not only was suspended matter evident in the liquids, but even after filtration all but copper showed a distinct metallic residue on evaporation. The amount of soluble matter was greatest in the case of lead and least in that of tin; but the quantity of insoluble suspended matter was very marked with the last-named metal.—Pharm. Journ., Feb. 23, 1901, 192; from Journ. Pharm. Chim. [6], *13*, 169.

Aluminum Alcoholates—Production by the Action of Aluminum Amalgam, Properties, etc.—V. Tistchenko has studied the action of aluminum amalgam on the various primary, secondary and tertiary alcohols: All univalent alcohols are able to react on aluminum amalgam, giving alcoholates $Al(OR)_3$; the essential condition of the reaction is that both the alcohol and the amalgam must be entirely free from water; the speed and ease of the formation and of the separation of the alcoholates, depend on the nature of the alcohols; as a general rule, the primary alcohols react more easily than the secondary alcohols, and these more readily than the tertiary. The physical properties of the principal alcoholates obtained have already been described; it may, however, be remarked that the tendency to crystallize is only slightly remarked in the alcoholates of the normal primary alcohols, but it becomes more and more apparent as the number of molecules of CH_2 increases; the aluminates of the isobutyric and isopropylic alcohols, of trimethyl carbinol and of dimethylethyl carbinol, can be obtained, however, in fairly large crystals, from their solutions in benzene or toluene. The molecular weight of the alcoholates has not been established by their vapor density, though many of them are volatile without decomposition; but the cryoscopic method indicates the general formula $Al(OR)_3$.—Chem. News, Jan. 25, 1901, 48; from Journ. Soc. Phys. Chim. R., xxxi., 694.

Beer—Selenium the Possible Cause of the Poisonous Effects Attributed to Arsenic.—Drs. Tunnicliffe and Rosenheim point out that in the majority of cases of so-called arsenical poisoning by beer, the gravity of the symptoms has far exceeded any possible quantity of arsenic absorbed. This has been somewhat vaguely attributed to the formation of some biological organic compound of arsenic, of a more intensely toxic nature than arsenic itself. The authors indicate, as a more probable cause, the presence of selenium, which they have found in quite considerable quantity even in several forms of "purified" sulphuric acid. It is practically certain that any selenium in the acid would pass into glucose during the process of inversion. The physiological effects of selenium are so similar to those of arsenic that they may easily be confounded. The lethal dose of Se is, according to C. Chabrié, 0.003 Gm. per kilo, for the dog. For the detection of selenium in colorless H_2SO_4, the authors recommend the well-known codeine color reaction, a green color passing to steel blue on warming. Pure acid gives no color. In a subsequent letter Drs. Tunnicliffe and Rosenheim state that in brewing sugar, as well as in beer containing arsenic, they have also detected the presence of selenium, and that they are occupied in carrying out the quantitative estimation of both those substances. No information is given as to the means by which the presence of selenium has been ascertained, and though the known existence of that substance in arsenical pyrites is naturally suggestive of the possibility that it might be introduced into brewer's sugar or beer in the same manner as

the arsenic with which it is naturally associated, its detection would be rendered very difficult by reason of the very small proportion in which it occurs.—Pharm. Journ., Febr. 16, 1900, 161 ; from Lancet, Nos. *4040* and *4041*, 318 and 434.

Dr. W. H. Wilcox, judging by the appearance of the arsenical mirror obtained by the Marsh test with contaminated beer, does not agree with Tunnicliffe and Rosenheim that any of the deleterious effects observed can be attributed to selenium, and expresses the opinion that this substance is not present. He finds that only a very small trace of selenium is sufficient to so far modify the mirror obtained on heating the tube in Marsh's test, that its presence could not well be overlooked. When selenium is present, the proximal half of the mirror has a different appearance, varying from vermilion red to a brown color in front of the black arsenical mirror in the distal portion of the tube. In all cases the extent of the arsenical deposit is markedly lessened by the presence of selenium. The author also notes that the white deposit observed when applying the Marsh test with arsenic-free chemicals is due to the presence of a minute trace of sulphur. It may be entirely avoided by passing the hydrogen, before entering the heated reducing tube, through potash bulbs containing lead acetate solution. This in no way interferes with the delicacy of the arsenic reaction. It is otherwise, however, if solid bodies be introduced for this purpose into the heated tube. It is found that even an inert substance, such as pure sand, will almost entirely prevent the deposition of arsenium on the glass to produce the mirror.—Pharm. Journ., April 6, 1901, 423 ; from Lancet, *160*, 778.

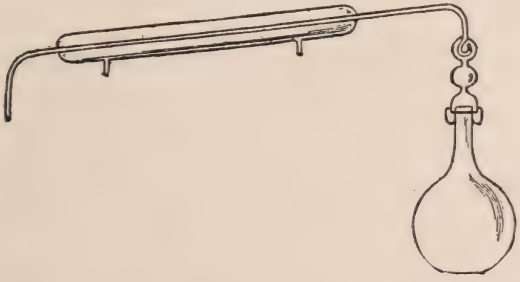
Ethyl Sulphuric Acid—Products Resulting from the Action of Heat.—The experiments of W. Ramsay and G. Rudorf show that ethyl sulphuric acid, when heated, yields as gaseous products of decomposition, sulphur dioxide, carbon dioxide and monoxide, and ethylene. The oxides of carbon, after the reaction has fairly started, are present in approximately equivalent proportions. When ethylene is bubbled through hot sulphuric acid, the products are the same in kind, and approximately the same in properties, as when ethyl sulphuric acid is heated. Furthermore, it was proved that even at 250° carbon monoxide does not deprive sulphuric acid of oxygen; hence the formation of carbon dioxide in the experiments described cannot be attributed to the oxidation of carbon monoxide ; it must have been a direct product of the reaction.—Pharm. Journ., Nov. 24, 1900, 571 ; from Proc. Chem. Soc., *16*, 177.

Ether—Apparatus for Securing Absolute Purity.—In the opinion of G. Ambühl it is doubtful whether an absolutely pure ether can be obtained by distillation in the ordinary apparatus provided with rubber or cork connections. In order to insure pure distillate he employs the apparatus shown by Fig. 58. The condenser, bulbs and delivery tube are constructed in one piece, and the connection with the distilling flask is effected by

means of mercury.—Merck's Rep., Oct., 1900, 463; from Journ. Soc. Chem. Ind., xix., 690.

Ethyl Chloride—Use as a Vehicle for Spontaneous Spray of Antiseptics.—Guilmeth directs attention to a new method of spraying antiseptics on to wounds. The drug is suspended or dissolved in ethyl chloride boiling at 11° C., and, contained in a suitable vessel, is heated to 20° or even 60° C., then sprayed by its own pressure over the surface of the wound. The antiseptic is thus brought into most intimate contact with the whole

FIG. 58.



Ether Apparatus.

surface, and the vehicle, being a good solvent of fatty matter, aids the process. The method is stated to have given excellent results in the hands of surgeons, particularly in the case of osseous wounds.—Pharm. Journ., Jan. 5, 1901, 7; from Bull. Comm., *28*, 520.

Aldehydes—Color Reactions with Piperidine and Sodium Nitro-prusside.—L. Lewin finds that acrolein, acetaldehyde, paraldehyde, propionaldehyde, and cinnamic aldehyde, give useful color reactions when piperidine is mixed with a solution of the aldehyde and of sodium nitroprusside. In the case of

Acrolein, an intense gentian-blue color is produced; it is pure blue in solutions containing 0.1 to 1.0 per cent., is perceptible in $\frac{1}{2000}$, and the limit is reached in solutions containing $\frac{1}{3000}$ of the aldehyde, it acquiring only a greenish color. The blue coloration becomes violet on the addition of ammonia, rose-violet with sodium hydrate, greenish blue with acetic acid, rusty brown with mineral acids, and dirty brown with hydrogen dioxide. The piperidine may be replaced by dimethylamine, but the reaction becomes less sensitive. The other aldehydes above named give similar color reactions, that with acetaldehyde being particularly sensitive, the limit exceeding 1 in 12,000, while formic aldehyde, trichloraldehyde, isobutylicaldehyde, benzaldehyde, salicylic aldehyde, phenyl-acetic aldehyde, œnanthol, and furfurol do not give any coloration with the reagents named.—Chem. News, July 27, 1900, 48; from Berichte, xxxii, 3388.

Aldehydes—Volumetric Estimation.—M. Ripper bases a method for the volumetric estimation of aldehydes upon the formation of aldehyde-bisulphite compounds. When an excess of alkali bisulphite solution is added to aldehydes in aqueous solution the reaction is complete in a short time, and the excess of bisulphite can be determined with volumetric iodine solution. No redution of the sulphuric acid, formed in the titration, by the iodine need be feared if 0.5 per cent. aldehyde solutions and a bisulphite solution containing 12 Gm. $KHSO_3$ in the liter are used. The method has been satisfactorily applied to the estimation of acetaldehyde, formaldehyde, benzaldehyde and vanillin.—Pharm. Rev., April, 1901, 173; from Monatsh. f. Chem., *21*, 1079, through Chem. Centralbl., *72*, 477.

Furfural—A Toxic Ingredient of Alcoholic Beverages.—Sir T. Lauder Brunton and Dr. F. W. Tunnicliffe consider that furfural is the ingredient in raw alcoholic beverages and crude spirits, which occasions the toxic symptoms observed in addition to the ordinary alcoholic intoxication. They point out that this toxic aldehyde is present in all raw spirits, and even in beer to a less extent, being derived from the pentosanes of the cellulose of the grain husks. The toxic action of furfural on animals and on men was demonstrated by the authors, and the absence of secondary symptoms in animals intoxicated with aldehyde-free alcohols was proved. In man, a dose 0.1 Gm. of furfural gave rise to acute neuralgia-like pain at the back of the neck, followed by a persistent dull headache. Incidentally, it is noted that ammonia, which is usually an ingredient in the matutinal "pick-me-up," is the most efficient antidote to furfural poisoning.—Pharm. Journ., December 22, 1900, 123; from Lancet, No. 4032, p. 1643.

Salicylaldehyde—A Powerful Antiseptic.—Experiments made by Salkowski show that salicylaldehyde is a powerful antiseptic. When added to culture media containing 0.5 per cent. of peptone, 0.25 per cent. ammonium tartrate, 0.5 per cent. di-potassium phosphate and 0.01 per cent. magnesium sulphate, and the mixture was set aside to germinate spontaneously, the presence of 0.1 per cent. of salicylaldehyde retarded the development of germs and prevented putrefaction, while 0.25 per cent. was proven to possess positive disinfectant effect.

Benzoic Anhydride, employed in the same manner, was found to have a similar effect.—Pharm. Ztg., Oct. 31, 1900, 843.

Chloral Hydrate—Precaution in Making the B. P. Volumetric Assay.—William Duncan observes that complaints regarding the official titration process for chloral hydrate are frequent among students, who, unless warned of the danger, generally get extraordinarily high results in their first attempts. This is due to different ideas as to what the B. P. means when it orders heat. Some men raise the temperature a few degrees,

others to boiling point, with the result that the samples turn out to be from 100 to 120 per cent. and upwards. If, instead of heating, the chloral and alkali are shaken until decomposition is complete, greater accuracy is obtained. Twelve determinations made by different workers on the same sample gave results varying from 99.2 to 100 per cent., the whole operation being done at nominal temperature. Repeated with heating, the results varied from 100 to 128 per cent.—Pharm. Journ., Mar. 23, 1901, 387.

Dimethyl-Ethyl-Carbinol-Chloral—Characters, Etc.—In a paper read before the Society of German Naturalists and Physicians at Aix-la-Chapelle (Sept., 1900), Dr. G. Fuchs gives a clear description of the physical and chemical characters, as well as of the therapeutical uses of dimethyl-ethyl-carbinol-chloral, which, in the form of a 50 per cent. solution, has been introduced into medicine under the name of

Dormiol. The pure compound is a colorless, oily fluid, having a pungent mint and camphor-like odor, and a cooling-pungent taste. Its 50 per cent. solution is permanent, and even solution of less percentage may be preserved for a long time in a cool place without change. It has the sp. gr. 1.24 at 15° C., congeals at —4.6° C., and is decomposed at 93° C. Its solutions cannot therefore be heated to boiling without decomposition.—Pharm. Ztg., Sept. 22, 1900, 734.

Chloroform—Association in Crystals with Lebrain.—G. Kassner has observed another instance of chloroform of crystallization. It crystallizes in molecular quantities with the *lebrain* from the lichen *Lebraria latebrarium* Acharius, viz., $C_{19}H_{18}O_9CHCl_3$. Earlier instances of chloroform of crystallization are enumerated: (1) with *berberine* in E. Schmidt's laboratory; (2) with *colchicine* ($C_{22}H_{25}NO_6.2CHCl_3$), by Zeisel; and (3) with *salicylid* and *homosalicylid*, by Anschuetz. — Pharm. Rev., April, 1901, 173; from Arch. d. Pharm. *239*, 47.

Chloroform—Determination in the Blood and Organs of Anæsthetized Animals.—Dr. James Edmunds communicates to the *Lancet* a method of estimating chloroform in the blood, secretions, or organs of animals anæsthetized with chloroform, which is rapid and precise. Dr. Edmunds prefers to determine the chlorine resulting from the decomposition of the chloroform, the weight of which being accurately determined, multiplication by the factor 1.12314 gives the weight of the chloroform. The disruption is managed by adding less than half the permanganate equivalent of chloroform to a solution made by dissolving 3.137grammes of potassium permanganate and 55.71 grammes of potassium hydrate in sufficient water to make 1 liter. On heating chloroform to 100° C. in such solution, disruption takes place almost at once, but a lower temperature and longer period are preferable. Care must be taken to prevent loss of chloroform by volatillization. When the reaction is complete the purple color of

the permanganate changes to the bluish-green color of the manganate. When quite cold, the solution is decolorized by the addition of decinormal solution of sodium sulphite, filtered and made up to a definite volume. The potassium chloride is estimated in the filtrate. — Chem. and Drugg., Oct. 20, 1900, 651.

Methyl Alcohol—Blindness and Death from Drinking Essences Prepared with it.—Dr. Herbert Harlan calls attention to several cases of poisoning by drinking essences of ginger and peppermint that have recently come under his observation. The one case was from Crisfield. Maryland, the other from Circleville, W. Va., both cases being admitted to the Presbyterian Eye, Ear and Throat Hospital. In the Crisfield case, the patient had drunk seven bottles of Jamaica ginger and was made drunk by it, then drank seven bottles more and fell into a stupor from which he awakened three days later almost blind, and he has since become completely so. In the Circleville case, three bottles of essence of peppermint and one bottle of essence of lemon had been drunk. Here also partial blindness resulted, but the case yielded to treatment, and the patient was considerably improved when he left the hospital. Dr. Harlan also reports on the cases of two deaths occurring at Fawn Grove, York Co., Pa., the details of which were communicated to him by Dr. V. Hawkins of that place. In one of these cases blindness preceded death, which in both cases followed the use of essence of ginger bearing the label of the same firm whose product had caused the blindness in the cases before mentioned. Taking all the circumstances into consideration, the author concluded that the essences—which were of the cheap kind—were prepared with wood alcohol, the symptoms throughout agreeing very strikingly with those heretofore observed in authentic cases of poisoning by methylic alcohol, and this conclusion is supported by the results of an examination of the essence of ginger (which see under "Pharmacy") by experts to whom authentic samples of the essences causing blindness in the first cases mentioned were submitted.—Pharm. Rev., Febr., 1901, 51–53.

Wood Alcohol—Legitimate Pharmaceutical Uses.—Frederick T. Gordon breaks a lance in defense of the use of wood alcohol in pharmacy. While admitting that the odor of much of the commercial wood alcohol is a serious objection to its use, this odor is not due to the methyl alcohol, but to its impurities, and these can be removed quite successfully—though only profitably on an extensive scale—so that pure methyl alcohol can now be easily obtained. Mr. Gordon claims that there are many preparations in which purified wood alcohol can be used, such as liniments, lotions, toilet preparations, etc. From personal experiments, also, he has become convinced that it may be used with advantage for the preparation of solid extracts, resinoids, and similar preparations in which the wood alcohol serves the purpose of solvent originally, and is then removed again by vaporization or otherwise. The one preparation for which it has been

recommended and for which it is not suited, is tincture of iodine, which, prepared with wood alcohol, possesses marked irritating effects. In searching for a reason for this, he considers it likely that this effect is due to the formation of formaldehyde and formic acid by the action of iodine on wood alcohol, or some of its impurities. Any effort, however, to so prepare wood alcohol that it can be used surreptitiously in place of grain alcohol should be sternly frowned down; if it is to be used, this use must be open and above board, sanctioned by the weight of authority unimpeachable.—Amer. Journ. Pharm., June, 1901, 285–289.

Reviewing the more recent literature concerning the use of methyl alcohol in preparations for internal or external use, E. Fullerton Cook concludes that, on the basis of observations and facts cited, pharmacists are not justified in substituting methyl alcohol for grain alcohol when the preparation is intended for internal administration. For heating purposes it may well take the place of the more expensive liquids, also as solvent in the preparation of solutions to be used in the arts, as varnishes, etc., and seemingly without objection in making pharmaceutical preparations in such cases where none of the methyl alcohol remains in the finished product.—Amer. Jour. Pharm., June, 1901, 289–292.

Methyl Alcohol—Convenient Method of Detection.—F. A. Sieker recommends the following convenient method for detecting methyl alcohol in pharmaceutical preparations: Pour 4 to 8 Cc. of the suspected preparation into a long test-tube and heat carefully so as to volatilize a part of the alcohol present. Immediately insert into the test-tube, and over (not into) the liquid, a copper spiral that has been previously heated to dull redness. Withdraw the spiral so as to permit its reoxidation, again insert it into the tube, and repeat this a number of times. As the oxidation of the alcohol vapor progresses the color of the spiral is changed from black (CuO) to red (Cu), and the odor of formic aldehyde will be perceived if methyl alcohol is present, by its pungent odor. The copper spiral used by the author was made from $\frac{1}{16}$ inch copper wire. By this method, the presence of methyl alcohol can be revealed in a few minutes, and may then be confirmed by some one of the more complicated methods that have been recommended. The method has been applied with satisfactory results to the following preparations: To a mixture consisting of 2 parts of methyl alcohol and 98 parts of water; to a suspected sample of liniment of soft soap that contained about 30 per cent. of methyl alcohol, and to a mixture consisting of 10 minims of fluid extract of ginger, 20 minims of methyl alcohol, 20 minims of ethyl alcohol and 50 minims of water.—Amer. Drugg., March 25, 1901, 162.

Methyl Alcohol — Presence in Fermented Fruit Juices. — According to Jules Wolff, the fermented juice of black currants, plums, cherries, black and white grapes, and other fruits, contain distinct traces of methyl alcohol. In the case of black currants minute traces were detected before

fermentation, but the proportion was greatly augmented after. The proportion present varies from 2 volumes for every 100 volumes of 90 per cent. ethylic alcohol formed in the case of black currants, to 0.2 volume in the same quantity of spirit from apples, and 0.15 to 0.4 from grapes. White sugar fermented with wine ferment gave no methyl alcohol, nor was even a trace found in any grain spirits, such as whisky, nor in rum, nor in commercial spirit of wine. As previously shown by Trillat, low-grade brandies distilled from marc contain a considerable quantity ; the amount present in genuine cognac and brandies of high grade amounts only to a trace. — Pharm. Journ., Feb. 2, 1901, 105 ; from Comptes rend., *131*, 1323.

Formaldehyde—Advantage of Glycerin Over Water as a Diluent.— Dr. A. C. Jones finds that glycerin is a much more suitable vehicle for the application of formalin than water, which is generally employed. He finds that the irritation which is occasioned by the antiseptic when applied in aqueous solution, and which has prevented its general use, is reduced to a minimum if glycerin be used instead of water. He has employed a 1 per cent. or 4 per cent. solution of formalin in glycerin as an antiseptic in many cases in affections of the mouth and throat ; it is also an excellent remedy for ringworm. When applied to the throat with a pharyngeal brush it will kill every micro-organism with which it comes in contact. In the early stages of follicular tonsillitis a 4 per cent. glycerole of formalin acts as a specific. One thorough application is sufficient ; this is usually followed by a little soreness, which only lasts a few hours. In ringworm one application of the 4 per cent. formalin glycerin, well rubbed in, is sufficient ; where there is much inflammation a piece of lint soaked in the application may be applied over the affected area. A little boric, zinc, or lead ointment is applied afterwards. — Pharm. Journ., April 6, 1901, 438 ; from Lancet, *160*.

Trional—Increased Hypnotic Effect by Paraldehyde.— According to T. Ropiteau the hypnotic effect produced when trional and paraldehyde are given together is four or five times greater than when trional is given alone, while the cumulative action of trional, by reason of the much smaller dose, is less likely to occur.—Pharm. Journ., Nov. 3, 1900, 508 ; from Bull. gen. de Therap., 140, 153.

Chloral-Orthoforms—Preparation and Characters.—Kalle & Co. have found that the two amid-oxybenzoic esters, known under the names of "Orthoform" and "Orthoform *new*," form compounds with chloral which have the advantage of increased hypnotic action and in being tasteless. They are obtained by simple trituration of the components in molecular proportion, or by adding the esters to the previously melted chloral hydrate. Both compounds form yellow crusts, which may be reduced by trituration to powder, are with difficulty soluble in water, but easily soluble

in ether or warm alcohol. When heated with diluted mineral acid chloral is split off.—Apoth.-Ztg., July 21, 1900, 493; from Chem. Ztg., 1900, 588.

Orthoform Sulphonate—A New Compound.—Paul Jacob has obtained the barium salt of a new sulphonic acid by dissolving *methyl para-amido-meta-oxybenzoate* in fuming sulphuric acid to saturation, diluting, and treating with barium carbonate. The new sulphonic acid, when liberated and recrystallized *in vacuo* from alcohol, gives fine needles melting at 208° to 209° C. with decomposition. A series of salts have been prepared, among which sodium para-amido-meta-oxybenzoate-methyl-sulphonate may possibly be found of use in medicine, since it is a definite chemical compound possessing the same physiological action as orthoform, but being much less toxic.—Pharm. Journ., Nov. 10, 1900, 511; from Journ. Pharm. Chim. [3], *12*, 210.

Cacodylic Acid and Cacodylates—Preparation and Characters.—In view of the recent therapeutic employment of cacodylic acid and its salts in France to a considerable extent, W. Harrison Martindale gives a description of their production and characters which will be found convenient for reference here in brief abstract. Starting with *cacodyl* (tetra-methyl-di arsenide) we have as oxidation products *cacodyl oxide* (tetra-methyl-di-arsine oxide) and *cacodylic acid* (di-methyl-arsinic acid). In these compounds the arsenic is supposed to be joined directly with the carbon of the molecules, and in passing from the cacodyl oxide to the acid the arsenic changes from the trivalent to the pentavalent. On heating equal parts of an alkaline acetate with arsenous acid, Cadet's Fluid, a mixture of cacodyl oxide and some cacodyl, is produced by the dry distillation. This is then redistilled in a current of hydrogen and treated under cold water with mercuric oxide in small quantities at a time. Rapid oxidation occurs, considerable heat is evolved, and the well-known odor of cacodyl disappears. The supernatant liquid containing the cacodylic acid and a little mercury cacodylate—which is removed by adding a few drops of cacodyl—is decanted from the metallic mercury, evaporated to dryness, the acid extracted by hot alcohol, which leaves it sufficiently pure—but if absolutely pure acid is desired, it may be converted into the barium salt and this decomposed by sulphuric acid.

Cacodylic Acid is monobasic and has the molecular weight 138. It may be obtained as anhydrous, colorless and odorless crystals in the form of oblique rhombic prisms. It is very soluble in water, less in alcohol, and fairly stable, though when kept for some time it deliquesces and is altered by moist air, a marked alliaceous odor having been developed in a sample kept eighteen months in a corked bottle. The acid contains 54.3 per cent. arsenic, equivalent to 71.7 per cent. of arsenous acid.

Sodium Cacodylate ($As(CH_3)_2OONa + nAq$), molecular weight 160, is prepared by exactly neutralizing cacodylic acid with sodium hydrate. It

contains 46.8 per cent. of As, equivalent to 61.8 per cent. As_2O_3, is very deliquescent and contains variable quantities of water according to the temperature at which crystallization took place and the nature of the solvent. The commercial salt mostly contains 2 to 3 molecules. It forms prismatic crystals and is easily soluble in alcohol as well as water. Many commercial samples of the salt contain free cacodylic acid, the amount of which may be determined by $\frac{N}{10}$ soda, using phenolphthalein as indicator. Of

Other Cacodylates the author mentions the *potassium salt*, which is more deliquescent than the sodium compound and contains one mol. aq.; *Lithium salt*, soluble in water and alcohol; *Calcium salt*, with nine mols. aq. prepared by neutralizing milk of lime with cacodylic acid; *Magnesium salt*, soluble, crystallizing with difficulty; *Silver salt*, stable to light when dry, but blackening on moistening; all of which are normal as to chemical formulæ. The *iron salt* is of variable composition—this should be $[O = As(CH_3)_2O]_6Fe_2$, and it should yield about 20 per cent. Fe_2O_3—in commerce is said to be often a mixture of oxides of iron with cacodylic acid. *Mercury cacodylate* is obtained in prismatic crystals from alcoholic solution. It is soluble in cold water, but the aqueous solution is decomposed when heated. The alcoholic solution is not altered on warming. Other compounds are guaiacol cacodylate of uncertain composition, alkaloidal cacodylates, and cinnamyl-cacodylic acid which is said to contain a molecule of each of the component acids and to be crystallizable. Of the different salts, the sodium salt is the one most popularly used, by the mouth, in half grain pills 3 or 4 times a day; hypodermically in ½ grain doses dissolved in 10 minims of water, or by rectal injection in 1 to 4 drachms of water.—Pharm. Journ., Dec. 22, 1900.

Cacodylates—Characters and Uses.—The following salts of cacodylic acid are described in "E. Merck's Ann. Rep." for 1900: Sodium, potassium, calcium, magnesium, lithium and quinine cacodylates are white crystals or powders, soluble in water. The potassium salt occurs in crystals which are only sparingly soluble in alcohol, and insoluble in ether; the quinine compound is more soluble in cold water than in hot, and is freely soluble in alcohol. Iron cacodylate is a greyish-yellow amorphous powder which dissolves freely in water, especially when heated, but less freely in alcohol. Guaiacol cacodylate is a mere mixture which occurs as a reddish-white crystalline mass soluble in alcohol and parts with cacodylic acid in the presence of water. Mercury cacodylate forms white crystals which dissolve freely in water, but only sparingly in alcohol.

Cacodylate of Iron has been administered subcutaneously in doses of 0.03 to 0.10 Gm. daily, the solution being prepared by dissolving 0.3 Gm. of the compound in 10.0 Gm. of sterilized distilled water. For internal use, 1.0 Gm. of the cacodylate is dissolved in 25.0 Gm. of cinnamon water, the dose being 20 to 30 drops of the solution three times daily.

Cacodylate of Mercury is now being experimented with clinically, the daily dose adopted for intramuscular application being 0.03 Gm.

Cacodylate of Sodium is administered subcutaneously, or in pills, to anæmic and chlorotic patients who cannot take iron, and in various other forms of indisposition. The compound should be used in the form of crystal, and be made into pills by the aid of white sugar and gum acacia, doses of 0.05 Gm. being given from one to five times daily in the treatment of skin diseases, while 0.025 to 0.05 Gm. per day is found sufficient in other cases.—Pharm. Journ., May 25, 1901, 666.

Guaiacol Cacodylate—A Weak, Unstable Compound.—A. Astine and H. Murco point out that the solutions of guaiacol cacodylate in alcohol and glycerin give reactions identical with those of guaiacol, and consider that affinity between its two constituents is very weak. It is dissociated completely by a trace of water, the whole of the cacodylic acid passing into solution. Similarly the whole of the guaiacol may be removed by treatment with ether, the acid being left insoluble. When an attempt is made to determine the melting-point of the body, droplets having all the properties of guaiacol are formed at about 70° C., while the cacodylic acid remains solid. It is supposed to be a combination of molecular weights of cacodylic acid with guaiacol, $As(CH_3)_2OOH_2.C_6H_4.OH.OCH_3$. It is a white crystalline salt, showing a prismatic formation under the lens. It is hygrometric, and contains about a molecule of water of crystallization. The authors have also obtained and describe

Cinnamo-Cacodylic Acid, a combination of molecular weights of cinnamic and cacodylic acids, having the formula, C_6H_5—CH : CH.COOH, $As(CH_3)_2OOH$, in the form of fine white prismatic crystals, melting at 79°–81° C. without decomposition, and undergoing no loss in weight at 100° C. It is sparingly soluble in ether, glycerin, and fatty oils, readily dissolved by alcohol, from which solution, however, water throws the cinnamic acid. It is completely decomposed by water into its constituent molecules. For medicinal use it should, therefore, be prescribed in the form of pills.—Pharm. Journ., Jan. 19, 1901, 53; from Journ. de Pharm. (6), *12*, 553 and 555.

Amylene Hydrate—Therapeutic Uses.—It is stated in "E. Merck's Annual Report," for 1900, that amylene hydrate has been found to cause a striking diminution of thirst and excretion of urine in diabetes insipidus, doses of 1 Gm. being taken in the morning and evening. It should be administered in gelatin capsules.—Pharm. Journ., May 23, 1901, 665.

Amyl Salicylate—Preparation, Characters and Uses.—According to B. Lyonnet, amyl salicylate, obtained by the action of chlorine on a solution of salicylic acid in amyl alcohol, is superior to methyl salicylate for the treatment of rheumatic affections. It has the advantage over the latter in possessing a less pronounced odor and in producing a decided

sedative effect. It is a colorless fluid of sp. gr. 1.065 at 15° C., boils at 250°, is nearly insoluble in water, but readily soluble in alcohol, ether and chloroform. Unlike amyl alcohol, it is non-poisonous.—Pharm. Ztg., Jan. 9, 1901, 29; from L'Union Pharm., 1900, No. 12.

Chlorotone—Formation, Characters, etc.—W. Lyon calls attention to the new hypnotic, introduced by an American firm under the name of chlorotone, which in scientific phraseology is

Trichlor Tertiary Butyl Alcohol. When chloroform and acetone in equal weight are mixed, and caustic potash slowly added, chlorotone is formed, and is obtained in white crystals by distilling with steam after removal of any undecomposed acetone or chloroform. The crystals have a camphoraceous odor, and are only sparingly soluble in cold water, but they are readily dissolved by chloroform, acetone, strong alcohol, ether, benzene and glacial acetic acid. It is not apparently affected by dilute acids or by alkalies, so that, although its low solubility in water is a handicap, there is the counter-balancing satisfaction that it is not readily altered or decomposed by admixture with ordinary medicinal chemicals. It is mainly recommended as a hypnotic and local anæsthetic, though it is also credited with possessing slight analgesic and antiseptic powers. The adult dose is stated to be from ten to twenty grains; an aqueous solution is therefore useless for administration, and resource must be had to other solvents in order to dispense it in a convenient form. In adult cases requiring a full dose the compressed tablets, or cachets, are undoubtedly the most pleasant way of taking it, because the nauseous taste is then imperceptible. The peculiarities of patients, however, make it desirable that medical practitioners should have other methods of prescribing it at their disposal, and the author accordingly gives a number of formulas for mixtures in which the chlorotone is suspended by the aid of acacia or glycerin—the chlorotone in some instances being dissolved in some aromatic tincture (Cardamon Co.) or in olive oil before emulsification. These may be consulted in Pharm. Journ., April 27, 1901, 521–522.

Creosote and Carbolic Acid—Action on Albumen.—In view of the conflicting statements concerning the coagulability of albumin by creosote and by carbolic acid, Jos. L. Mayer has made some experiments which seem to prove that creosote coagulates egg albumen more powerfully than does carbolic acid—either natural or synthetic. This is in contradiction to the positive statement of the U. S. P., 1880, which says: "Creosote does not coagulate albumin," while the 1890 edition is silent on this point, under creosote, but states under carbolic acid that "on adding this acid either to albumin or collodion, coagulation takes place (difference from creosote)," thus leading to the inference that creosote does not coagulate albumin. In the experiments made, the author found that on adding creosote to a filtered solution of fresh egg albumen, containing about 20 per cent. of added water, coagulation promptly occurred under formation

of a gelatinous mass so consistent that it could be cut with a knife. On repeating the experiment on a portion of the identical albumin solution with natural carbolic acid, a mobile flocculent fluid resulted, which did not gelatinize until standing at least four days. With synthetic carbolic acid, a very fluid mixture containing only a few flakes was formed, which did not thicken or gelatinize until after the sixth day. The creosote used was Merck's beechwood variety of the highest purity. The carbolic acid contained just enough water to liquefy it.—Merck's Rep., August, 1900, 359.

Phenol—Volumetric Determination with Potassium Permanganate.—James F. Tocher, in search for a practical method for the volumetric determination of phenol in the presence of its homologues, gives the details of his studies and investigation which have led him to recommend potassium permanganate as suitable for this purpose. He finds that phenol, treated with potassium permanganate in the presence of normal or acid sodium carbonate is oxidized to oxalic acid, while the hydrated oxides of manganese are deposited, and that in the absence of other oxidizable substances, as great, if not greater, accuracy can be attained, volumetrically, than by any of the halogen processes now commonly employed. The titration may be carried out as follows: 1 Gm. phenol is dissolved in 1000 Cc. of water, and of this solution 10 Cc. (= 0.01 Gm. phenol) taken for titration. About 3 to 4 Gm. $NaHCO_3$ is added, together with a little water; then 50 Cc. decinormal permanganate are added, the liquid boiled for five minutes, and set aside to cool a little. Dilute H_2SO_4 is now added gradually, until the mixture is neutralized, and then to decided excess. The mixture is warmed to 60° C., and decinormal solution of oxalic acid added, with stirring, until the color is discharged. If the phenol is pure, 29.78 Cc. of the permanganate solution will have been consumed by 0.01 Gm. of the substance taken.—Pharm. Journ., Mar. 25, 1901, 360–361.

Phenol—Color Reaction with Oil of Peppermint.—Paolo Fiora states that if an excess of phenol is rubbed down with oil of peppermint a bluish-green color reaction is obtained after the lapse of a certain time; this disappears on warming, but is again evident when the mixture cools. This reaction is distinctive of phenol, and is not given by creosote, guaiacol, resorcin, and other allied bodies.—Rev. Pharm., *11*, 39, after Boll. Chim. Farm.

Liquefied Carbolic Acid—High Congealing Point of the B. P. Preparation.—E. W. Lucas finds that the official (B. P.) liquefied carbolic acid prepared by adding 10 parts by weight of water to 100 parts by weight of phenol, is objectionable because of its comparatively high congealing point. The lowest temperature at which it can be kept fluid is 13.5° C. He proposes the adoption of a preparation obtained by diluting 5 parts by weight of phenol with enough water to make 6 parts by volume. This has the sp. gr. 1.058, contains 78.8 per cent. of phenol (50 grains in a fluid dram Imp. measure), and does not congeal until nearly 2° C.—Chem. & Drugg., Dec. 1, 1900, 889.

Phenolic Esters of Boric Acid—Characters.—P. Hillringer has prepared and describes a number of phenolic esters of boric acid. *Boric Acid Triphenyl Ester* is a colorless crystalline mass, melting at about 30° C., and easily decomposed by water or on exposure to the air. *Boric Acid Metacresyl Ester* melts at 40° C., and resembles the preceding in character. *Boric Acid Trinaphthyl Ester* forms colorless scales, melting at 115° C.—Pharm. Ztg., Mar. 6, 1901, 194; from Liebig's Annal., *31*, 1.

Benzosol—History, Preparation, Uses, etc.—F. G. Ehlert has prepared a comprehensive review of the observations concerning benzosol that have been published since its discovery by Bongartz in 1890. The review gives the synonyms—of which there are no less than 16—history, methods of formation and preparation, physical, chemical and therapeutic properties, and closes with an exhaustive bibliography to date, embracing also the studies of different authors (1886–1890) which led to the discovery of the guaiacol derivative by Bongartz. The author brings forward no original observations in his paper, which may be consulted in Pharm. Rev., May, 1901, 203–213.

Quinone—Occurrence in Invertebrates.—While investigating the properties of the venom excreted by the cutaneous glands of the common myriapod, *Julus terrestris*, Béhal and Phisalix have made the interesting discovery that quinone is the active principle of this fluid. This body has not previously been recorded as being found among such secretions. Beijerinck has discovered that quinone secreted by a saprophytic fungus, *Streptothrix chromogenes*, found on the roots of certain trees, plays an important part in the formation of humus. Its physiological significance in the myriapod which also lives upon decaying vegetable matter has not yet been established, except in so far as its powerful odor may serve the animal as a protection from its enemies.—Pharm. Journ., Jan. 12, 1901, 28; from Comptes rend., 131, 1,004.

Ortho-Guaiacol Sulphonate of Potassium—History, Preparation, Characters, etc.—F. G. Ehlert gives a very comprehensive review of the history, formation, preparation, properties and therapeutic uses of ortho-guaiacol sulphonate of potassium, more familiarly known under the commercial name

Thiocol, from which the following salient points may find place here. Although the free o-guaiacol sulphonic acid is mentioned for the first time in chemical literature in 1899, its potassium salt was evidently prepared by Tiemann and Koppe as early as 1881, although this was evidently a mixture of the salts of two acids, determined by Barell to be the ortho- and para-guaiacol sulphonic acids respectively, obtained by the action of sulphuric acid on guaiacol. The first mentioned chemists used guaiacol isolated from wood-tar for this purpose, while Barell employed synthetic guaiacol and has shown that the conditions of temperature can be so controlled as to obtain exclusively the ortho-acid at 70° to 80°, or the para-

acid at 140° to 150°. Thiocol occurs in small, almost colorless prisms, or large rhombic plates, or as a micro-crystalline powder of slightly pinkish color. It is perfectly stable in the air, readily soluble in an equal quantity of cold water, difficultly in diluted alcohol, and almost insoluble in alcohol. It is odorless and possesses a faintly bitter taste which changes to a sweet one, but has not even a suggestion of a taste similar to that of guaiacol or creosote. It reduces potassium permanganate and silver nitrate, gives a blue color with ferric chloride, changing to light yellow on careful addition of ammonia, and is differentiated from para-guaiacol sulphonic acid and compounds by producing yellow, red or even violet dyes, of intense color, by the introduction of various dye-yielding bases into it. The therapeutic advantages claimed for thiocol over all other guaiacol preparations are, that it is devoid of odor, readily soluble in water, non-irritant to mucous membranes, and readily absorbed. Quantities of 10 to 15 Gm. *pro die* have been administered for long periods without deleterious effects. Under the name of

Tirolin, an orange flower syrup of thiocol has been put upon the market by a French firm, containing according to Schwarz from 6 to 7 per cent. of thiocol and 40 per cent. of sugar. A bibliography is appended to the paper abstracted.—Pharm. Rev., April, 1901, 162–166.

Glycerin—Commercial Quality.—Charles H. LaWall and Robt. C. Pursel have examined ten samples of glycerin, representing 150,000 pounds, and found them all to comply with the U. S. P. requirements, with the single exception of the test for fatty acids. This test is either too rigid, or the manufacturers of glycerin are careless in its purification, for every sample developed a distinctly acidulous odor when heated with dilute sulphuric acid under the requirements of the official test. The specific gravities of the samples ranged from 1.2535 to 1.2610, the average being 1.2572.—Proc. Pa. Pharm. Assoc., 1900, 160.

Crude Glycerin — Estimation of Ash. — The glycerin extracted from oils and fats is sold commercially under the name of glycerin from saponification. According to commercial custom, it should have a density of 1.240, and should not leave more than 5-thousandths of ash or dehydrated incombustible material, after evaporation and calcination of the residue. Calixte Ferrier observes that, as this ash estimation is ordinarily conducted, owing to the high heat employed, some of the salts are volatilized, and concordant results are rarely obtained. These salts are, however, removable by water from the preliminarily calcined tarry residue of evaporation, and on this he bases the following method, which yields constant and exact results to a 10-thousandth: 10 Gm. of the glycerin are evaporated in a platinum crucible, taking care as much as possible to prevent loss by projection. The tarry residue is then calcined at a moderate temperature, and after roughly crushing the spongy mass, 5 or 6 Cc. of distilled water are poured into the crucible, and after a few moments' digestion,

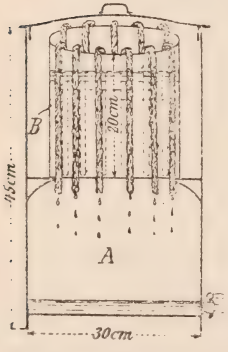
the solution obtained is drawn off by the aid of a pipette. A second washing is then made in the same way, with the same quantity of water, and the two solutions are set aside. The contents of the crucible are then dried at the high temperature necessary to turn off the whole of the carbon. After cooling, the two solutions are added to the calcined residue, evaporated under the usual precautions, and finally raised to a red heat for a few seconds in a Bunsen flame.—Chem. News, Dec. 28, 1900, 308; from Monit. Scient., Dec., 1900, 808.

Calcium Glycero-Arsenate—Preparation, Characters and Uses.—Pagel has obtained calcium glycero-arsenate by heating calculated quantities of glycerin and arsenic acid together for several days, until a uniform brown mass results, which is diluted with an equal volume of water and neutralized with milk of lime. The filtrate is evaporated somewhat and then treated with 95 per cent. alcohol, which precipitates the calcium compound in the form of a very light powder. This is washed several times with alcohol and finally with ether. So obtained, calcium glycero-arsenate forms a granular powder, insoluble in water and alcohol, only partly dissolved by citric acid, but very readily soluble in other organic acids and in the mineral acids. Therapeutic experiments made by Spielman prove the new compound to be readily absorbed into the system, certain in its effects, and therefore preferable to the arsenic preparations in popular use. It is administered in doses beginning with 0.01 Gm.—Pharm. Ztg., May 22, 1901; from Journ de Pharm., 1901, No. 10.

FIXED OILS.

Fixed Oils—Filtering Device.—H. Haeflin recommends the device shown by Fig. 59 for filtering fixed oils, which commends itself for simplicity and efficiency. The outer vessel, *A*, is provided with a stop-cock for the withdrawal of the filtered oil, three brackets at about the centre of its height, upon which a smaller vessel, *B*, rests, the whole being provided with a cover. The inner vessel is filled with the oil to be filtered, and a number of loosely twisted cotton wicks are suspended in this vessel so that the inner length shall reach to the bottom of the vessel, while the outer extends to a little below, as shown in the drawing. The inner ends of these wicks are kept securely to the bottom of the vessel by attaching small weights to them. The oil passes clear through the wicks and drops into the outer receptacle, whence it is withdrawn from time to time as it accumulates.—Pharm. Ztg. Oct. 31, 1900, 843.

FIG. 59.



Filtering Device.

Almond Oil—Substitutes, etc.—W. E. Allen and E. T. Brewis make

some interesting observations concerning the source, yield, characters and substitutions of almond oil. The "true" almond oil of commerce is, as is well known, obtained almost exclusively from *bitter* almonds by expression, the press cakes yielding the volatile oil of almonds. The almonds are supplied from different countries, which may be designated broadly as "Southern Europe and countries adjacent," and particularly as Morocco, Canary Islands, Portugal, Spain, France, Italy (Sicily), Syria and Persia, which yield the principal supplies. Of these, the almonds from Sicily are particularly well assorted into sweet and bitter, while the almonds known as "Barbary" bitter, as they reach European markets from Mogador, are always more or less mixed with sweets, and again sweets with bitter. Those from Saffi, Mazagan, and occasionally Rabat, are less objectionable in this respect. French, Syrian and Persian practically resemble the Sicilian almonds as regards the quality of the oil they produce. But the production of "commercial" oil of almonds is not confined to almonds as the source, for apricots and peach kernels are largely imported and used for preparing expressed oils, which, although sold under their proper names and source in England, are constantly described from abroad as "almond oil." These kernel oils are slightly more limpid and possess a more nutty flavor than true almond oil, and do not possess the same keeping quality, hence give rise to various troubles when they have been used unwittingly in place of genuine almond oil. They must, however, be regarded as *substitutes* rather than *adulterants* of almond oil, and are recognized easily by the color reaction produced with nitric acid, which with apricot kernels is red, while almond oil produces a yellowish-white. In recent years, however, the authors have met with undoubted cases of adulteration. The principal adulterants to be looked for are the oils of rape, cotton, sesamé, poppy, olive and arachis, but the authors do not enter into this branch of the subject in their present paper. In a table, they give the results of their examination of a large number of almond oils expressed from different kinds of almonds and from oils expressed from apricot kernels at home, as well as of foreign pressed oils. The foreign pressed oils, including one of French origin, gave a salmon-red or brownish red reaction with nitric acid, as did the samples expressed from apricot kernels, while the true almond oils, home expressed, and one sample designated as "French pressed," gave a white, greenish-yellow color.—Trans. Brit. Pharm. Conf., 1900, 359–363.

Almond Oil—Iodine Number as a Means of Detecting Adulteration with Other Oils.—Schimmel & Co. find that the iodine number obtained with almond oil from the best Bari and Sicilian almonds is situated between 96 and 98 when the test of the Germ. Pharm. is applied, which requires that 100 parts of the oil should absorb not less than 95, nor more than 100 parts of iodine. The test is not available for detecting the oil from peach kernels or rape seed, the iodine numbers of which are 99 and 100 respec-

tively, but it is available for detecting large quantities of olive oil or linseed oil, the first having an iodine number of 81 to 84, while that for linseed oil is very high—from 170 to 180. Almond oil containing 25 per cent. of olive oil showed an iodine number of 93, while one containing 50 per cent. showed 89.—Schimmel's Rep., Oct., 1900, 6.

Oil of Akee—Characters and Constants.—E. M. Holmes gives some account of the introduction of the akee tree, a native of the coast of Guinea, in West Africa, into the island of Jamaica, where it now appears to be cultivated generally on account of its fruit. The botanical name of the tree, given by Koenig, is

Blighia sapida. It is usually about 30 feet high, but sometimes reaches fifty, and forms a beautiful object when, about Christmas time, its fruit ripens. This is about the size of a goose's egg and of a yellow or red color, forming a pleasing contrast with the bright green color of the leaves. The fruit consists of three carpels, each containing one shining black seed, which is exposed to view by the dehiscence of the fruit when it becomes ripe; they are as large as a nutmeg and are seated on, and partly immersed in, a large white or cream-colored, fleshy substance or arillus, which is the edible portion, and is said to be the portion from which the oil is obtained. In consideration of the possible commercial and economic value of the oil, Mr. Holmes submitted a sample to Professor Collie for examination, the results of which are now reported by W. Garsed. The oil of akee is a yellow, non-drying, butter-like fat at ordinary temperature, consisting of a liquid portion and a solid granular portion. It has a peculiar odor, and an oily, somewhat unpleasant taste. It begins to melt at about 25° C., and is quite fluid at 30° C., but does not become perfectly clear until it reaches 35° C. Its contents have been ascertained by methods described, the results being given in the following table along with those of palm oil and of olive oil:

Test.	Akee Oil.	Palm Oil.	Olive Oil.
Specific Gravity	°C 99–100 | 0.857 (Water at 15.5° = 1)	°C 98–99 | 0.8586 (Water at 15.5° = 1)	°C 15.5 | 0.914 to 0.917 (Water at 15.5° = 1)
Melting Point	°C 25 to 35	°C 27 to 42.5	°C 2.5
Solidifying Point	20	21 to 27	°C +2 to —4
Hehner Value	93	94.2 to 97	95.4
Saponification Value ..	194.6	196.3 to 202.5	185 to 196
Reichert Value.....	0.9	0.5	0.3
Iodine Value	49.1	51 to 52.4	81.6 to 84.5
Acid Value	20.1		

Akee oil contains approximately about 50 per cent. of liquid glycerides,

calculated as olein, from the iodine value; about 40 per cent. of solid glycerides, and about 10 per cent. of the free acids contained in these glycerides. The specific gravity was taken at a temperature of 99°–100° C., and compared with water at 15.5° C. The number found, 0.857, approximates closely to that of palm oil, which has a specific gravity of 0.8586 at a temperature of 98°–100° C.—Pharm. Journ., Dec. 15, 1900, 691.

Castor Oil— Physical and Chemical Constants. — Edwin Dowzard has determined the chemical and physical constants in sixteen samples of castor oil, which show the following limits of variation for the pure oil: sp. gr. at 15.5° C., from 0.960 to 0.967; optical rotation in a 200 Mm. tube at about 16° C., + 8° to + 9°; refractometer number at 22° C., + 39 to + 42; solubility in 90 per cent. alcohol, 1 in 3 to 4 volumes; solubility in petroleum ether, none: saponification value, 175 to 182; viscosity, 1.160 to 1.190 seconds for 50 Cc. at 100° F.; acetyl value, about 150. Its high viscosity and sp. gr., its insolubility in petroleum ether, and its solubility in alcohol, render it an easy task to detect sophistication.—Chem. and Drugg., Feb. 23, 1901, 325.

Castor Oil — Optical Activity. — Edwin Dowzard calls attention to the abnormal optical rotation of castor oil, which, moreover, occupies a unique position among fixed oils because of its high viscosity, its behavior to solvents, etc. Nearly all fixed oils are slightly active, but not more than — 0.5° per 200 Mm. The optical rotation of castor oil, however, varies from 8.3° to 9.0° per 200 Mm. This activity is due to ricinoleic acid. Sesame and croton oils are also characterized by more than common optical activity.—Pharm. Journ., Oct. 20, 1900, 458.

Castor Oil—Emulsification of the Commercial Article by Boiling Water Alone —Adolf G. Vogeler calls attention to a remarkable observation made when attempting to produce a "tasteless" form of castor oil by simply shaking it, as recommended in a particular process, with twice its volume of hot water. A persistent and perfect emulsion was formed, from which the oil afterwards could not be separated even after standing days and weeks. A second trial, with a different sample of oil, resulted the same way, as did numerous samples afterwards. The explanation of this peculiar behavior of the castor oil offered by the author is, that it contains a large percentage of mucilaginous matter of a nondescript nature, and that the emulsion became more tenacious by prolonged boiling would seem to indicate that some substance in the oil was rendered soluble, forming mucilage. The oils experimented on were all of American origin, so far as known. It is clearly a subject for fruitful investigation.—West. Drugg., Nov., 1900, 595.

Linseed Oil—Modification of B. P. Tests.—Having occasion to examine some linseed oil with the view to establishing its purity, C. R. C. Tich-

borne found the sample to correspond in every respect to the official (B. P.) requirements except that of solubility in alcohol, which is stated to be one part in ten parts of 90 per cent. alcohol. Further experiments proved that no pure sample of linseed oil, among which was some prepared by the author direct from the seed, would respond to this test, and that, in fact, pure linseed oil is practically insoluble in alcohol of 90 per cent. In summing up the results of his observations, he expresses the opinion that the official (B. P.) characteristics of oleum lini should be given as follows: "Specific gravity, 0.930 to 0.935. It is practically insoluble in alcohol (90 per cent.) at ordinary temperature. It is miscible with oil of turpentine in all proportions, giving a bright solution. Fifty Gm. being weighed in a glass beaker, and 10 Cc. of sulphuric acid gradually added (so that about 60 seconds is taken in its delivery), the mixture also kept stirred by a thermometer immersed in it; the rise of temperature observed in this experiment should not be less than 114° C." This test of Maumené at once detects the adulteration by all foreign seed oils, and has the advantage over the iodine absorption test in being much less complicated to apply, while equally servicable.—Pharm. Journ., Nov. 24, 1900, 573.

Olive Oil, B. P.—Reduction of Specific Gravity Limit.—Edwin Dowzard has taken the specific gravities and refractometer numbers (at 22° C.), of 53 samples of olive oil, covering the different commercial sorts—Algerian, Barcelona, Bari (A, B, C and D qualities), Corfu, Cream Tuscan, Extra Cream, Cream Virgin, Best Sublime, Mytelene, etc.,—and obtained figures which show the following range: 7 samples, 0.915; 40 samples, from 0.9155 to 0.9165; 4 samples, 0.917; and 1 sample, 0.9172. According to the B. P., the specific gravity of olive oil varies between 9.14 and 9.19. The latter figure, as is shown in the author's results, is much too high, and allows the use of inferior oils pressed at high temperatures. The official maximum figures should, therefore, be altered. Lewkowitsch in his "Chemical Analysis of Oils, Fats and Waxes," states that the sp. gr. of olive oil varies from 0.914 to 0.917, but may rise to 0.920, and even 0.925 in the case of commercial oils, expressed at a high temperature, owing to the large proportion of palmitin.—Trans. Brit. Pharm. Conf., 1900, 514.

Sesame Oil—Delicate Reaction for Its Presence in Other Oils.—Tambon employs as a reagent to detect the admixtures of sesame with other vegetable oils, a solution of chemically pure crystalline glucose 3 to 4, in hydrochloric acid 100. One volume of the reagent is shaken with two volumes of the oil under examination for two or three minutes: the emulsion is then warmed over the flame of a spirit lamp until ebullition just commences, when the mixture is again agitated. If the least trace of sesame oil be present, a fine rose color with a violet shade, passing to cherry red, is obtained. Pure olive oil remains perfectly colorless under this treatment. If it contains 1 to 5 per cent. of sesame oil the character-

istic tint is developed in a few minutes, while with 10 per cent. an immediate reaction is obtained. — Pharm. Journ., Feb. 2, 1901, 105 : from Journ. Pharm, Chim [6], *13*, 57.

Oil of Black Walnuts—Yield, Characters, &c.—Lyman F. Kebler states that he has been unable to secure, after frequent and repeated efforts, a pure oil of walnuts, which is in demand chiefly by artists as a drying oil, possessing the advantage over linseed oil that the varnish produced by it does not crack. The article supplied seems in every instance to be a concoction, two samples mentioned being composed chiefly of ethyl alcohol — the one having a peppermint flavor, the other the odor of oil of mirbane. The walnut oil devised and generally used is that obtained from *Juglans regia*, L., the kernels of the nut containing from 30 to 40 per cent of " virgin " oil, which the oil obtained from hickory nuts, known as " American Nut Oil," resembles very much. The oil of black walnuts, *Juglans nigra*, L., on the other hand, is stated by Wm. T. Brannt (1896, " A Practical Treatise on Vegetable Fats and Oils") to be of little value. Mr. Kebler prepared some of this oil by grinding the black walnut kernels and subjecting them to expression, obtaining 25 per cent. of oil, although the kernels actually contained 60 per cent. This oil is limpid, straw-yellow, has a pleasant odor and taste, a sp. gr. of 0.9215 at 15° C., becomes turbid at —12° C., and was found to have the following constants : Saponification number, 190.1–191.5 ; acid number, 8.6–9 ; ether number, 181.5–182.5 ; Hehner's number, 93.77 ; Reichert-Meissel value, 15 Cc. ; iodine value, 141.4–142.7 ; m. p. of fatty acids, 0° C. The drying qualities are excellent, and artists have pronounced it very satisfactory.—Amer. Journ. Pharm., April, 1901, 173–174.

CARBOHYDRATES.

Starch—Variation in Quantity in Evergreen Leaves.—Professor Miyake states that (in Japan) the amount of starch in evergreen leaves at any one period of the year differs greatly in different plants. As a general rule those of monocotyledons contain less starch than those of dicotyledons, gymnosperms, and pteridophytes. The minimum occurs about the end of January ; from the end of February the amount again increases. In Central and Southern Japan many evergreen plants contain some starch in the chlorophyll grains during the coldest period of winter ; while in Northern Japan it usually disappears entirely at that time from the mesophyll and the guard-cells of the stomates. Although the processes are comparatively feeble, assimilation and the transport of starch are carried on during the winter.—Pharm. Journ., June 29, 1901, 805 ; from Bot. Mag., Tokyo, 1900.

Cane Sugar—A New Plant Yielding it in Central Africa.— Aug. Chevalier gives an account of a new sugar-yielding plant, a species of *Panicum*, growing on French territory, in inundated regions on the banks

of the Niger and the lakes in the neighborhood of Timbuctoo, in Central Africa. While not found in any quantity south of the 13° of latitude, it has been met with on the White Nile, an indication that there may be a future for the plant in Egypt. The sugar derived from the plant is highly esteemed by the natives, who, moreover, use the plant for a variety of economic purposes. The ripe grain is eaten raw, and also prepared for food in various ways.—Pharm. Journ., Oct. 13, 1900, 414; from Rev. Cult. Colon., 7, 513.

Sugar—Iodometric Estimation by Means of Fehling's Solution.—N. Schvori, finding the methods of Lehman and Riegler, followed by Magnenne, for the volumetric estimation of sugar to be vitiated by several errors of more or less importance, suggests a return to the older formula of Soxhlet-Meisel for the Fehling's solution, and has adopted the following modification of the methods referred to: 10 Cc. of solution of cupric sulphate (69.28 Gm. to 1000 Cc.) and 10 Cc. of tartrate solution (346 Gm. Rochelle salt and 100 Gm. sodium hydrate to 1000 Cc.), are run into an Erlenmeyer flask of 200 Cc. capacity; 50 Cc. of distilled water are added, and the whole boiled for two minutes. After cooling the solution under a tap, 10 Cc. of a 20 per cent. solution of potassium iodide are added, followed by 10 Cc. of 25 per cent. sulphuric acid (1½ volumes conc. H_2SO_4 to 8½ volumes H_2O). The iodine liberated is immediately titrated by means of decinormal solution of sodium hyposulphite. The experiment is then repeated with the sugar solution, using such a volume that contains at the most 90 milligrammes of inverted glucose or saccharose, or 125 of lactose. The difference between the two titrations represents the quantity of sugar in the sample under examination. In the case of

Lactose, the boiling must be kept up for five minutes; consequently the boiling point in the preliminary determination of the strength of Fehling's solution must be kept up for the same number of minutes.—Chem. News., Oct. 19. 1900, 191; from Ztschr. Angew. Chem., xii., 633.

Commercial Glucose—Characters and Composition.—In view of the introduction of commercial glucose as an excipient into the B. P., 1898, B. S. Coupland reviews the known facts concerning its preparation, characters, composition and tests. It is prepared both from starch and from cellulose. When prepared from starch the conversion takes place by the action of dilute acids, usually sulphuric; from cellulose it is prepared by the action of strong sulphuric acid, which is allowed to remain in contact for some time, and afterwards boiled with water—the general treatment after conversion being the same in both cases and generally well known. Ordinary glucose is very variable in composition. The proportions of dextrose, maltose and unfermentable carbohydrates vary considerably; traces of albuminoids are sometimes found, and generally a small percentage of ash. The unfermentable carbohydrates have been but imperfectly studied, and very little definite knowledge appears to have been gained concerning them. Among these is

Gallisin, which has been prepared from starch sugar by fermentation with yeast, evaporating, treating the unfermented residue with alcohol and ether, in which gallisin is almost insoluble; the residue was dissolved in water, decolorized by animal charcoal, and evaporated at a low temperature, being finally dried over sulphuric acid. The product is a white powder, readily decomposed by heat, which causes it to give off water and carbon dioxide. It is stated to have the composition $C_{12}H_{14}O_{10}$; it is a reducing agent, its cupric oxide reducing power being given as 45.6; it is dextro-rotatory. It yields a large proportion of dextrose when heated with dilute sulphuric acid.

While glucose is manufactured which contains 99 per cent. of dextrose, the following tables probably well represent the composition of the commercial article, the examinations having been made on lines laid down in Allen's "Commercial Organic Analysis." The determinations in the first table were made on four samples of commercial glucose, two liquid, two solid; samples are assumed to contain only dextrose, dextrin, water and ash. The dextrin is calculated by difference. The symbol "K" is used to signify the cupric oxide reducing power.

	Liquid.		Solid.	
	1	2	1	2
Rotation.	+ 115.33	+ 111.87	+ 56.21	+ 51.96
"K" in Terms of Dextrose	41.67	43.11	76.92	83.33
Dextrin	41.24	39.93	10.50	4.12
Moisture	16.27	16.18	11.75	11.57
Ash	0.52	0.78	0.83	0.98
	100.00	100.00	100.00	100.00

The estimation of the various constituents which may occur in glucose is at present by no means exact. The uncertain character of the unfermentable carbohydrates, and the lack of precise knowledge concerning the physical and chemical properties of gallisin, complicate a task which the mere number of bodies occurring in the substance would render difficult. Both physical and chemical means are employed, the former being an observation of the rotation of the plane of a ray of polarized light by the substance, and the deduction of the solid matter contained in a solution of it by taking the solution density. The following figures, deduced from the same experimental data, are much more approximate than those in the first table, but are not scientifically accurate, seeing that they take no account of gallisin or inactive carbohydrate:

	Liquid No. 1.	Liquid No. 2.
Dextrose	18.85	23.11
Maltose	36.48	32.27
Dextrin	27.88	27.66
Moisture	16.27	16.18
Ash	0.52	0.78
	100.00	100.00

The principal impurity of consequence appears to be calcium sulphite derived from the materials used in the process of preparation. According to Kirby, American glucose sometimes contains notable quantities, while German glucose is comparatively free from it. With regard to

Arsenic in Glucose, this undoubtedly exists in some samples, and is derived from sulphuric acid made from pyrites; but the evil has evidently been greatly exaggerated. Of six samples examined only one was found to contain arsenic, which, at best, can be present only in a small percentage. The sample containing arsenic was free from sulphite, whilst the other five samples, which contained no arsenic, gave decided reactions for sulphite.—Pharm. Journ., Dec. 22 and 29, 1900, 728–729 and 762–764.

ORGANIC ACIDS.

Oxalic Acid—Use as an Emmenagogue.—It is stated in "E. Merck's Annual Report," for 1900, that oxalic acid has been recommended as an emmenagogue, 2.0 Gm. being dissolved in 100.0 Gm. of infusion of tea, and 75.0 Gm. of syrup of orange added to make a mixture, of which one tablespoonful was taken every hour.—Pharm. Journ., May 21, 1901, 666.

Succinic Acid—Estimation in Fermented Liquids.—J. Laborde and L. Moreau recommend the following method for the estimation of succinic acid in fermented liquids, which is quicker and quite as accurate as those already in use. Operating upon liquors completely or nearly fermented, 100 Cc. of the liquor are evaporated to dryness on the water-bath in a porcelain crucible having a flat bottom, together with 20 Gm. of white sand previously washed with hydrochloric acid and calcined; the sand is well mixed with the residue while the latter is still in a syrupy condition. The mass becomes hard on cooling. To facilitate its subsequent treatment, it is advisable to allow the mass to soften a little by exposing it to the action of the air for a few hours. It is then placed in a 250 Cc. matrass, 100 Gm. of No. 4 shot and 30 Cc. of ether are added. Agitation with the shot completely exhausts the mass after three fresh additions of ether, which is decanted each time on a flat filter. The ether is driven off, and the residue dissolved in a small quantity of boiling water, and a decinormal solution of potash added in the presence of phenolphthalein. When the titration is finished an excess of potash is added, and we proceed to

the saponification of the glyceric ethers; it suffices to evaporate the solution to dryness in a beaker on the water-bath, and to take up this residue with water and titrate the free potash contained. The figure thus obtained for the total succinic acid is a little high; the error is due to a little volatile acidity, which is not completely driven off during the evaporation of the wine. To detect this volatile acidity it suffices to take up the liquor saturated with potash, to set free the volatile acid by tartaric acid, and to estimate it by distillation.—Chem. News, July 13, 1900, 20; from Ann. de l'Inst. Pasteur, xiii, 657.

Lactic Acid—Simple and Delicate Test.—Thomas Maden reviews several of the tests that have been proposed for the detection of lactic acid, and proposes the following one which is characterized by simplicity, delicacy and accuracy. Four grains of sulphocarbolate of zinc and 2 gr. of ferric chloride are dissolved in ½ oz. of distilled water, when a dark ruby-colored liquid is produced. This possesses marvelous delicacy as a reagent, so much so that 1 part of lactic acid in 100,000 of water can be readily detected by it, the ruby color of the reagent being at once changed to a pale yellow. In order that the test should be in the most convenient form, the author suggests that it be prepared in tablets. If the perchloride of iron be perfectly dry, the two chemicals can quite safely be mixed, and, provided it be kept free from moisture, there is no reason why the compound tablet should not keep unchanged for an indefinite period.

In order, however, to be quite certain that lactic acid is present it is necessary to adopt one of two courses—either to ascertain whether free hydrochloric acid is absent, and, if so, to apply the ferric-sulphocarbolate test directly, or to separate the lactic acid and test it specially. The first alternative is best carried out by using Gunzberg's reagent, which consists of phloroglucin 2 grammes, and vanillin 1 gramme, in 30 Cc. absolute alcohol. About half a teaspoonful of the liquid is taken and a few drops of the reagent added, and the whole evaporated on a water-bath. If free hydrochloric acid is present, a rose-red ring appears round the dish just above the level of the liquid, due to the formation of red crystals. In order to separate the lactic acid Dr. Shufflebotham gives a process based on Berthelot's discovery that if a mixture of a mineral acid and an organic acid be agitated with ether, the ethereal layer which separates contains a fixed proportion of organic acid. The aqueous layer having been removed by a separator, the ethereal liquid is mixed with a little water, and the ether evaporated by means of a water-bath. The acid solution is then tested by the ferric-sulphocarbolate test, or it may be, if desired, estimated quantitatively by means of decinormal soda, using phenolphthalein as an indicator.—Chem. & Drugg., Sept. 29, 1900, 552.

Lactic Acid—Influence of its Fermentive Organisms on the Ripening of Cheese.—L. Epstein points out the great importance of a knowledge of the bacteriology of the process of making cheese. He finds that the exact

nature of the ripening cheeses depends largely on the lactic acid organisms present. By the production of enzymes these affect both the odor and the perfection of the ripening.—Pharm. Journ., Jan. 19, 1901, 53; from Archive für Hygiene, *37*, 329.

Lactic Acid—Therapeutic Uses.—It is stated in E. Merck's "Annual Report" for 1900, that lactic acid is now used in cases of alopecia as a means of restoring the function of the hair follicles and counteracting atrophy of the papillæ. The hair should be cut as short as possible and, after washing the scalp with soap, the following lotion should be applied: Mercuric chloride, 0.2; lactic acid, 1.0; 90 per cent. alcohol, 100.0; sulphuric ether and spirit of lavender, āā 50.0. When the scalp is dry again it should be rubbed with a cotton plug which has been soaked in an aqueous (1 to 2) or alcoholic (1 to 3) solution of lactic acid. An 80 per cent. solution of lactic acid has also been used for cauterizing the mucous membrane of the tympanic cavity in cases of obstinate otorrhœa in scrophulous patients.

Iodoso-Benzoic Acid—Characters and Uses.—In the Annual Report of E. Merck for 1900, attention is directed to the possible therapeutic value of iodoso-benzoic acid, $C_6H_4.I(OH).O.CO$, discovered by V. Meyer. It is described as forming a white, crystalline powder, melting at 214° C. under decomposition, insoluble in cold water, and sparingly soluble in ether, but readily soluble in hot water. This compound possesses the property, when applied locally, of splitting off free iodine in contact with potassium iodide contained in the circulation, which makes it possible to maintain a persistent local iodine effect—the sole objection to this treatment being the locally irritant effect of the acid itself.—Pharm. Ztg., Mar. 6, 1901, 196.

Cinnamic Acid—Detection in Benzoic Acid.—A. Jorissen proposes a test for the detection of cinnamic acid in benzoic acid which depends upon the oxidation of cinnamic acid into benzaldehyde when its solutions, in contact with uranium acetate or nitrate, are exposed to the direct sunlight—the benzaldehyde being recognized by its odor. The actinic rays are necessary for the reaction, which does not take place in the dark. To test benzoic acid, a few decigrammes are suspended in a small flask containing a few Cc. of 5 per cent. uranium acetate solution, which is then securely corked and exposed to direct sunlight; when only small traces of cinnamic acid are present, 1 Gm. of acid to be tested is heated to boiling with 10 Cc. of water, cooled and filtered, the last portion of liquor being removed by gentle pressure from the crystals, which separate. This filtrate is then added in a small flask to 4 Cc. of uranium acetate solution, then treated as described above.—Pharm. Journ., June 15, 1901, 747; from Annales Chim. Analyt., 6, 41.

Saccharin—Method of Distinction of Commercial Qualities "550" and

"*350*."—Edwin Dowzard states that at the present time the two principal qualities of saccharin are known as "550" and "350," the numbers referring to the sweetness compared with cane sugar. He recommends the following method for the easy and quick distinction of the two, as well as the estimation of their admixture—the method depending on the solubility of saccharin in acetone: One gramme of saccharin is treated with 10 Cc. of acetone; the mixture is thoroughly agitated and allowed to stand for almost ten minutes, precautions being taken to prevent evaporation. 5 Cc. of the clear solution is then evaporated and the dry residue weighed. The ascertained weight, multiplied by 200, will give the approximate percentage of saccharin present. The method is, however, useless for so-called "soluble saccharin." One gramme of "550" saccharin should be perfectly soluble in 12 Cc. of acetone at about 16° C. In the case of "350" saccharin or mixture of "350" and "550" saccharin, there will be a considerable amount of insoluble matter.—Trans. Brit. Pharm. Conf., 1900, 516.

Saccharin — New Reaction.— A. Leys finds that a solution of saccharin in the presence of a very dilute solution of ferric chloride, and a trace of hydrogen peroxide, develops a violet color, which is very permanent. The ferric chloride reagent is prepared by diluting 2 Cc. of the solution, sp. gr. 1.264, to 100 Cc. with distilled water. The hydrogen peroxide used is a dilution of 1 Cc. of 10 volume strength in 200 Cc. of water. To 5 Cc. of a solution containing saccharin, 2 drops of the ferric chloride reagent is first added, then 2 Cc. of the dilute hydrogen peroxide; in the course of thirty to forty-five minutes a distinct violet coloration will be obtained. In testing milk for saccharin, the casein and fatty matter are precipitated by means of solution of potassium acid sulphate, in the presence of a little alcohol; the clear liquor is decanted and shaken out with ether. The ether extract is evaporated, and the residue dried at 90° C., then treated with 5 Cc. of water. If this solution has a sweet taste, the presence of saccharin is confirmed by the test described above. Butter is dissolved in a mixture of equal volumes of chloroform and alcohol. This solution is washed with twice its volume of water; the aqueous layer is decanted, evaporated and tested as above. If a color be obtained as soon as the ferric chloride solution is added, before the addition of the dilute hydrogen peroxide, the presence of a phenolic body is indicated. Similarly, the formation of a white precipitate with ferric chloride points to the ocurrence of an aromatic acid. —Pharm. Journ., June 8, 1901, 717; from Comptes rend., *132*, 1056.

Saccharin—Quantitative Determination in Foods.—H. Defournel bases a method for the quantitative determination of saccharin in alimentary substances on the conversion of the extracted saccharin into the ammonium salt, and the decomposition of the latter by means of alkaline hypobromite, the nitrogen evolved being measured. From the volume of gas

obtained the proportion of saccharin present is found. 250 Cc. of the liquid to be examined, rendered distinctly acid with dilute H_2SO_4, is shaken out three times with 50 Cc. of a mixture of equal parts of ether and petroleum ether. The ethereal extract is evaporated, the residue saturated with ammonia, and heated to drive off any excess; it is then dissolved in water, and introduced into a nitrometer or ureometer, the nitrogen being liberated by means of hypobromite solution precisely as in a urea determination. Each 0.1 Cc. of nitrogen ÷ 8.9 indicates in centigrammes the amount of saccharin in the quantity of liquid treated.—Pharm. Journ., June 22, 1901, 773; from Journ. de Pharm [6], *13*, 512.

Salicylic Acid—Interference with the Digestive Functions when Present in Food Products.—In reply to a query propounded by a committee of the Maryland Pharmaceutical Association, Mr. J. F. Hancock has consulted the literature on the subject, and adds his own experience in laboratory experiments, which lead him to conclude that such addition is of necessity harmful, since the presence of salicylic acid not only suspends the action of diastase, but also the starch-digesting power of the pancreatic secretion. It is evident, therefore, that the addition of this body to food products interferes with a very important function of digestion.—Proc. Md. Pharm. Assoc., 1900, 116.

Propionyl-Salicylic Acid has recently been introduced and recommended as a valuable remedy for gout and rheumatic affections. The new acid is obtained by the action of propionic acid anhydride on salicylic acid, forming white, shining scales, which melt at 95° C., are sparingly soluble in water, but more readily soluble in alcohol, benzene, ether and chloroform. By prolonged boiling with water it is split up into its component acids, and the same effect is produced by alkalies, a mixture of the two salts being formed. It does not produce the violet color characteristic of salicylic acid when added to ferric chloride solution.—Pharm. Ztg., Oct. 3, 1900, 770.

Mercuric Salicylate—Process of Valuation.—E. Rupp suggests as an alternative process for the official (Ph. G. IV.) process of determining the mercury in mercuric salicylate: 0.3 Gm. of the salt is rubbed down with a little water and macerated in a closed flask with 25 Cc. decinormal iodine solution. After standing for an hour the excess of iodine is titrated back with decinormal thiosulphate. The results were concordant, but in all experiments somewhat lower than theoretical requirements, a result due, in the author's opinion, to the formation of a soluble substance in the process of the preparation of the salicylate.—Arch. d. Pharm., *239* (March 25, 1901), 114.

Bismuth Ammonio-Citrate—A Remedy in Gonorrhœa.—It is mentioned in "E. Merck's Annual Report," for 1900, that ammonio-citrate of bismuth has been used in Janet's method of urethral irrigation in gonorrhœa.

A very dilute solution (1 : 20,000) is used the first day; a stronger solution (1 : 2000) on the second day, and a still stronger one (1 : 500) on the third day.—Pharm. Journ., May 25, 1901, 665.

Citrate of Lime—Analysis.—A. Soldani and E. Bertè observe that of the two methods commonly employed for the analysis of commercial citrate of lime, the one depending on the precipitation of pure calcium citrate, the other on the formation of a lead salt, and subsequent titration of the citric acid liberated by H_2S in the case of the latter process, find that there is a variation of as much as 2 per cent. in the two methods, and that the lime process is the better of the two. It should be carried out as follows: One Gm. of the moderately powdered sample is rubbed up with 10 Cc. of warm water, then treated with 20 drops of hydrochloric acid, neutralized in the cold with N/2 NaOH in the presence of phenolphthalein untilthe rose-color remains, and then treated with 3 Cc. of acetic acid. The solution is filtered, and, with the washings, evaporated to dryness on the water-bath in a porcelain crucible; it is then taken up with 20 Cc. of boiling water, well rubbed up, filtered, and carefully washed with 55 Cc. of water, dried and calcined for ten minutes, and the CaO weighed. A grave source of error is to attempt to dissolve the citrate in acetic acid. The pure salt is not entirely soluble; this gives rise to too low results. Pure citrate of lime is hygroscopic.—Chem. News, Jan. 18, 1901, 36; from Gazz. Chim. Ital., xxix., 489.

Cream of Tartar—Improvement in Quality Since 1884.—At a meeting of the Chemists' Assistants' Association, London, H. S. Coupland spoke interestingly of the progressive improvement in the quality of cream of tartar. While in 1884 the assays of cream of tartar revealed from 8 to 14 per cent. of calcium tartrate, and in 1885 from 7 to 10.5 per cent., the larger percentages being found in the smaller crystals, the average from 1886 to 1900 was 6.5 per cent.; 1891 to 1894, 5.5 per cent.; 1895 to 1897, 3.0 per cent.; 1898, 5.0 per cent.; and 1899 to February, 1901, 4.6 per cent. But cream of tartar of greater purity is by no means an exceptional article, potassium bitartrate respectively 98 and 99 pure being quoted, the latter coming from America.—Pharm. Journ., Mar. 2, 1901, 282.

Potassium Bitartrate—Use for Standardizing Alkaline Solutions.—F. H. Alcock observes that the suggestion made some time ago to employ sodium hydrogen oxalate in preference to oxalic acid for the purpose of standardizing alkaline solutions is well grounded because of the difficulty of obtaining the acid free from certain impurities. The author had, however, for some time used potassium bitartrate for this purpose with good results. This salt is now obtainable in the market in a condition of great purity without difficulty, and, moreover, is a salt which can readily be purified almost absolutely in the laboratory.—Pharm. Journ., Oct. 20, 1900, 444.

Tartaric Acid—Production of a New Acid by Calcination.—L. J. Simon has succeeded in isolating a new acid from the products of the calcination of tartaric acid in the presence of potassium sulphate, pyruric and pyrotartaric acid being also produced. It forms crystals which, when purified by crystallization from hot alcohol, melt at 164°, after becoming greasy towards 158°. They re-solidify spontaneously at 156°. This new compound sublimes easily when heated to perfectly white needle-shaped crystals or transparent plates. It is moderately soluble in boiling water and crystallizes out on cooling. It is soluble in ether and acetic acid. The substance is a feeble acid, neutral to helianthine but acid to phthalein. The author also prepares its potassium salt, $C_7H_7O_3K2H_2O$, the acid itself having a composition represented by $C_7H_8O_3$, and so being unsaturated. Bromine can be fixed in the cold. The potassium salt gives with silver nitrate a yellowish gelatinous precipitate, with lead acetate a white, and with copper acetate a bright green precipitate. This acid is isomerous with pyrotartaric acid, but is certainly distinct from it, and the author believes it to belong to the group of the furfurane acids.—Chem. News, Nov. 2, 1900, 219; from Compt. rend., Oct. 8, 1900.

In a second paper Simon communicates the results of further investigations of the new acid derivative of tartaric acid which he finds to be isomerous with pyrotartaric acid, $C_7H_8O_3$, but distinct from it. He gives it the provisional name of

Isopyrotartaric Acid. When dissolved in water or an organic solvent, it gives with ferric salts, especially with the chloride, a very intense violet coloration. This coloration is very stable, not being alterable by time or heat. It is decomposed by strong acids, but on dilution will re-appear if the acid is not present in too large quantities. Although it seems to be premature to attribute to this acid a definite composition from the facts mentioned in this and the preceding paper, it presents a certain analogy to salicylic acid, and so may be considered as a dihydrox-oxybenzoic acid, $C_6H_4H_2(OH)CO_2H$.—Chem. News., Nov. 9, 1900, 231; from Compt. rend., Oct. 15, 1900.

Pseudo-Agaricic Acid—A New Constituent of Agaric.—The wide differences in the formulæ and melting points attributed to the so-called agaricic acid by various investigators have induced Adrian and Trillat to review the matter. By extracting powdered agaric with alcohol boiling at 95° C., removing the solvent by distillation, and extracting the residue with hot benzene, a white crystalline mass was obtained, which, when recrystallized from boiling alcohol, formed needle-shaped crystals, melting at 258° C. When exposed to moist air for several days, the melting point is lowered to 240° C. These had the formula $C_{39}H_{60}O_6$, to which the name pseudo-agaricic acid has been given. The high melting point at once shows that this substance is quite distinct from the so-called agaricic acid of other workers, the melting point of which is variously given as 69.5° and 142°.

The new pseudo-agaricic acid is quite devoid of any physiological action. —Journ. Pharm. Chim. (6), 13, 103.

Usnic Acid—Distinctions in Various Lichens.—O. Widman finds that usnic acid occurs in lichens in three isomeric conditions, differing in their physical characters. Thus the usnic acid of several varieties of *Usnea barbata* is dextrogyre, having the index + 49.30° and melts at 203° C.; that of *Cetraria nivalis*, and of *Cladonia ranginifera*, var. *alpestris*, is lævogyre, —49° 58′, and melts at 191° C.; while again, that from several other lichens is optically inactive. The two optically active acids, when crystallized together, give a racemic inactive acid; they also lose their optical activity on prolonged boiling in acetic acid. Usnic acid crystallizes in yellow needles, having the formula $C_{18}H_{16}O_7$; it is mono-basic, giving colorless salts. It appears to possess aldehydic or ketonic functions.—Pharm. Journ., Sept. 8, 1900, 285; from Journ. Pharm. Chim., 12, 21.

Neucleinic Acid—Possible Value in the Uric Acid Diathesis.—The studies and experiments of Kossal and Goto seem to point out the possibly important value of neucleinic acid in combating the uric acid diathesis. It is now produced and marketed in form of a white powder, which is soluble in diluted alkalies.—Pharm. Ztg., March 6, 1901, 196; from E. Merck's Annual Rep. for 1900.

Picric Acid—Variation of Color Under Different Conditions.—W. Marckwald finds that while picric acid is of a more or less yellow color, when crystallized in concentrated hydrochloric acid it is almost colorless; if this latter acid is removed and the picric acid is washed with water it regains its yellow color. The mother-liquors, which are faintly tinged with yellow, take a much deeper tint on the addition of water. All these phenomena can be explained by the theory of electrolytic dissociation, if we admit that picric acid by itself is quite or nearly colorless, but that the ion $C_6H_2(NO_2)_3O$ is yellow. The different manners in which picric acid behaves can be shown by the following lecture experiment: When we add yellow commercial picric acid to ligroin we obtain with this non-dissociating solvent a colorless solution which contains very little picric acid. If we remove this liquid and shake it up with several times its volume of water, the latter becomes of an intense yellow color. Picric acid, when crystallized from a warm saturated solution of ligroin, is almost white.—Chem. News, March 1, 1901, 100; from Berichte, vol. xxxiii., 1128.

Tannin—Conversion into Gallic Acid by a Zymase from Certain Moulds.—See *Tannase*, under "Albuminoids."

Tannin—Percentages Present in Various Materials.—Among the papers left by the late Prof. Henry Trimble were some valuable memoranda recording the results of tannin examinations in a great variety of tannin-

bearing plants, and intended to be used by him in future volumes of his work "The Tannins."* These results, representing a considerable expenditure of time and care, have now been compiled by his assistant for many years, Mr. Josiah C. Peacock, who communicates them in the American Journal of Pharmacy (July and September, 1900, 334–342 and 429–432), without addition to the results or attempts to draw conclusions from them. The following is a condensed abstract in which only the tannin percentage, calculated from absolutely dry substance and obtained by the hide-powder method of estimation, are given, and even these are of necessity generalized in some cases:

Rhus Typhina. The material was collected at different periods ranging from June to October. The maximum tannin content in the root bark was 11.27 per cent. (July), the minimun 1.46 per cent. (Oct. 28). The inner stem bark contained 11.78 per cent. in August, 3.82 per cent. in October. The leaves yielded 28.64 per cent. in July, 17.41 per cent. in September, but again 22.91 per cent. in October. The fruit, 14.41 per cent. in Aug., 9.88 per cent. in September.

Rhus Glabra. Root bark yielded the highest percentage, 7.98 per cent., in July. The lowest percentages—3.59, 3.56, 3.15 per cent.—when collected in June, October and January. The stem bark, 11.03 per cent. in July, 3.59 per cent. in October. The leaves, 40.52 per cent. in July, 28.89 per cent. in October, 13.83 per cent. in early June, but later in the same month as high as 28.61 per cent. The flowers yielded 30.36 per cent. in July, the berries, 15.57 per cent. in July, 9.78 per cent. in September.

Rhus Copallina. Root bark, 14.84 per cent. in August; 8.24 per cent. in October. Inner stem-bark, 11.61 per cent. in August; 6.04 per cent. in September. Leaves collected July 24th yielded 42.51 per cent.; August 10th, 17.74 per cent.; August 16th, 33.28 per cent.; October 16th, 32.29 per cent. Flowers collected in July, 48.85 per cent.

Rhus Semialata. Root bark, 7.40 per cent.; leaves, 2.77 per cent.

Rhus Canadensis. Leaves, 21.62 per cent.

Ron Ron. An anacardiaceous wood from Costa Rica, containing 6.78 per cent. of tannin.

Chamoecyparis Spheroidea. The bark yielded 4.44 per cent. of tannin.

Taxodium Distichum. The bark contained 10.45 per cent. of tannin.

Juniperus Communis. The root bark, 7.71 per cent,; stem bark, 5.66 per cent.; leaves, 5.18 per cent. of tannin.

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* These memoranda complement Profs. Trimble and Bastin's valuable contributions on the tannin constituent of the coniferæ as developed in their work on "Some North American species of the coniferæ abstracted for previous reports, (see Proceedings, 1896–97–98.)

Juniperus Virginiana. Stem bark, collected during 8 different months, from May to February, contained 8.28 per cent. in July, 8.59 per cent. in August, and fell during the three last months to 3.93, 3.56 and 2.05 per cent. respectively.

Larix Americana. Bark of the branches, collected in the Adirondacks in August, 13.98 per cent.; that collected at St. David's, Pa., in July contained only 8.89 per cent. of tannin.

Larix Europea. The stem bark, collected in January, contained 15.91 per cent. of tannin.

Pseudotsuga Toxifolia. A bark from Klamath Falls, Ore. (January) contained 8.15 per cent.; another from Forest Grove, Ore. (February), contained 14.05 per cent. of tannin.

Pinus Ponderosa. Bark from Klamath Falls, Ore., 4.20 per cent.; bark from Colorado Springs, Col., 4.89 per cent. of tannin.

Taxus Canadensis. Bark from Perkiomen, 20.46 per cent.; bark from the Adirondacks, 17.01 per cent. of tannin.

Thuja Gigantea. Root bark, 10.71 per cent.; stem bark, 8.16 per cent.; leaves, 9.14 per cent. of tannin.

Thuja Occidentalis. Root bark, 5.77 per cent.; stem bark, 6.13 per cent.; leaves, 5.85 per cent. of tannin.

Castanea Pumila. Root bark, 17.18 per cent.; stem bark, 6.36 per cent. of tannin.

Fagus Ferruginea. The stem bark contained 2.44 per cent. of tannin.

Carpinus Americana. The stem bark contained 3.67 per cent. of tannin.

Alnus Serrulata. The bark contained 6.05 per cent. of tannin, while that of

Alnus Rubra (the latter from Forest Grove, Ore.), contains 9.84 per cent.

Quercus Prinus. Inner bark, 11.12 per cent.; outer bark, 7.16 per cent.; entire bark, 10.59 per cent. Samples of the barks of

Quercus Arizonica, contained 5.88 per cent.

Quercus Oblongifolia, 8.39 per cent.

Quercus Macrocarpa, 13.05 per cent.

Quercus Garryana, 6.16 per cent., and

Quercus Virens, 3.55 per cent., while acorns from

Quercus Reticulata contained 3.08 per cent. of tannin in the pericarp, and 4.20 per cent. in the kernels.

Jatropha Cardiophylla, Muell. The roots and stems, used as a tanning material under the name of "Sangre de Drago" by the Indians and Mex-

icans for producing an exceedingly fine leather, contains 5.27 per cent. of tannin.

The following mangrove barks, obtained from Dr. Ridley, of the Singapore Botanical Gardens, were also examined and found to contain the appended percentage of tannin:

Rhizophora Conjugata, 17.90 per cent.; *Bruguiera Caryophylloides*, 8.96 per cent.; *Rhizophora Mucronata*, 19.57 per cent.; *Bruguiera parviflora*, 7.98 per cent.: *Bruguiera rheedii*, 19.37 per cent.; *Sumnitzera coccinea*, 11.75 per cent.; *Carapa mollucana*, 27.56 per cent.; and *Ceriops candolleana*, 24.19 per cent. Lastly, two species of

Potentilla were examined.

Potentilla Norwegica contained 2.22 per cent. of tannin in the root, 0.45 per cent. in the stem, and 4.13 per cent. in the leaves and flower heads: while the leaves of

Potentilla Canadensis contain 13.34 per cent.

ORGANIC BASES.

The Assay Processes of the U. S. P.—Criticism. — Prof. Francis Hemm makes some practical observations concerning the assay processes of the U. S. P., with particular reference to the proposed augmentation of assay processes in the forthcoming revision of that standard, in which he emphasizes the following points: (1) That, while it is presumed that the results obtainable by the three official assay processes would seem to be attainable with fair uniformity, the literature on the subject proves the contrary, since numerous suggestions are made to secure accurate and uniform results. (2) That the assay processes being intended for the use and instruction of pharmacists, they should be so promulgated as to enable the average accomplished pharmacist to follow them with a reasonable degree of certainty in results. (3) The assay processes being constructed and formulated on such a basis, manufacturers should be expected to make their assays in conformity with the official instructions, and not by methods of their own, which may, or may not, be more accurate. "If fairly accurate results are not or cannot be obtained in different hands by the same directions of assay, then the mission of the assay is a deplorable failure."

Alkaloidal Assay—Difficulties and Precautions.—H. M. Gordin contributes a valuable paper on the assay of crude drugs, in which he enters very exhaustively into the difficulties that may be encountered in the alkaloidal assay of drugs and galenical preparations, and points out how these may be overcome. The very excellent work in connection with alkaloidal assays hitherto done by this author, is a guarantee of the thoroughness and reliability of the observations recorded in the present paper, the nature of which makes it impracticable, within the scope of this report, to make an

abstract in detail. The author's introductory remarks, however, may here be quoted at some length, because they give a clear intimation of the purport of the paper. He observes that the exactness of an assay will depend in the first place upon the completeness of exhaustion of the material to be assayed, and in the second place upon the exactness of the method which is employed for the estimation of the alkaloids. With regard to the latter, the method proposed by the author some time ago (see Proceedings, 1900, 866) seems to work very well with all alkaloids except those which are not precipitated by Mayer's or Wagner's reagents in very dilute solutions (coniine), or those that are only precipitated by these reagents in presence of a very large excess of acid (colchicine). In applying this method to the assay of drugs, it is often found that upon addition of the reagents mentioned the precipitate obstinately refuses to separate out even upon prolonged shaking. In such cases the addition of a little talcum powder, which of course must be perfectly neutral, and a little shaking, will speedily throw down all the precipitate, leaving a perfectly clear supernatant liquid. The error in titration which is liable to arise from the addition of talcum is probably so small that it can be safely neglected unless extreme accuracy is reqnired. The only other condition upon which the exactness of a drug assay depends is, then, the complete extraction of the alkaloids. In the case of fluids, the complete extraction of the alkaloids presents no difficulty, this being easily accomplished by the aid of immiscible solvents. But the case is very different with solid, not wholly soluble substances, particularly crude drugs. The complete exhaustion of crude drugs is cometimes connected with such difficulties that very often fluid extracts contain much less alkaloid than is known to be contained in the drug which the extract is supposed to represent. It is well known, for example, that fluid extract of nux vomica, as sent out by most manufacturers, contains only about 1½ per cent. of total alkaloids, whereas the drug itself generally contains from 3 to 3¼ per cent. (!? Rep.). In the pharmacopœial directions for making fluid extracts we are told to continue the percolation till the drug is exhausted; but how is this to be determined? The author has shown in a previous paper (see Proceedings 1900, 133) that the absence of appreciable quantities of alkaloid in a few drops of percolate is not sufficient proof of complete exhaustion, in the case of colchicum. The only way to prove the completeness of exhaustion is to remove a portion of the drugs, and, after drying them, digesting a few hours with Prollius' fluid. After filtering and shaking out with acid water, the presence or absence of alkaloidal matter can then be ascertained by means of the general alkaloidal reagents. The author calls attention to several assay methods, of reputable authority, which are faulty on account of the failure to secure the absolute exhaustion of the crude material under examination, and sums up the necessary and sufficient demands which should be put upon a standard method, as follows:

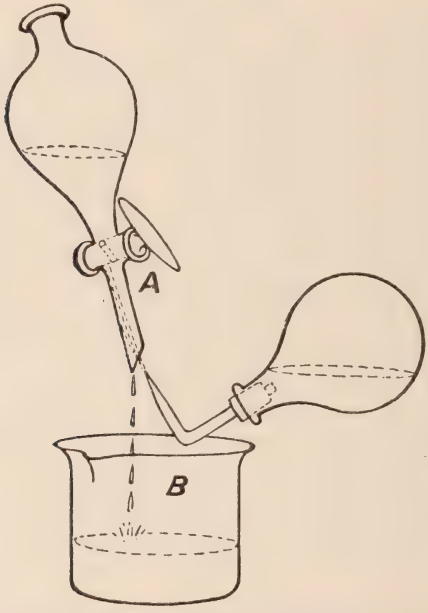
(1) That the exhaustion should be so complete that no alkaloid could be found in about 5 Gm. of the drugs by the method indicated above.

(2) The operations involved in the standard method should only be such as are not liable to injure the alkaloid under consideration. Heat, strong acids or strong alkali, and prolonged exposure to air should therefore be avoided as much as possible. As it is impossible to exhaust some drugs like nux vomica, ipecac and cinchona without the use of acids, only very dilute acids should be used.

After then describing two general methods, *A* and *B*, the author gives in detail their application to the assay of a number of drugs—coca, hydrastis, nux vomica, cinchona (bark and fluid extract), ipecac, and conium (seed and leaves)—and a comparison with certain standard methods for their assay.—Amer. Journ. Pharm., April and May, 1901, 159–168 and 211–220.

Alkaloidal Assay—Improved Method of Using the Separator. — In the

FIG. 60.



Improved Method of Using Separator.

shaking out process with ether during alkaloidal assays, difficulty is sometimes experienced from the small amounts of colored aqueous layer retained in the neck of the separating funnel. To obviate this, Arthur W. Nunn has devised an expedient which proves entirely satisfactory, and becomes intelligible by the accompanying cut (Fig. 60). The lower stratum having been run off into the vessel, *B*, and the ethereal fluid being

allowed to pass through the tap to the outer end of the bored hole, the tap is immediately shut off just sufficient to prevent any of the ethereal fluid from passing through. A two- or three-ounce flask filled with ether, having a glass exit tube bent as shown, the end being drawn to a fine point, is then grasped in the hand and held in the position shown, when the warmth of the hand will expel the ether in a fine spray which passes up the tube, *A*, as far as the top, and effectually washes out the adhering colored liquid, the washing being collected in the vessel, *B*, and utilized in a subsequent washing of the aqueous liquid if this should be necessary. The ethereal fluid may be drawn off clean into a tared vessel in the usual way.—Pharm. Journ., Aug. 25, 1900, 238.

Alkaloids—Volumetric Estimation by Neutralization.—C. Kippenberger has studied the volumetric estimation of a large number of alkaloids, a given quantity of the alkaloid being dissolved in 100 Cc. (a decided excess) of $\frac{N}{10}$ sulphuric acid, the volume brought to 1,000 Cc., and, an indicator having been added to 50 Cc. of the solution so obtained, the excess of acid was determined with $\frac{N}{50}$ sodium hydroxide. As the result of his studies, the author finds that in order to obtain quantitative results the following conditions must prevail:

(a) The degree of dissociation of the alkaloidal salt in aqueous solution should be small. Sulphates answer this requirement best.

(b) The indicator-alkaloid molecule should have a small dissociation factor, which will be the case when either (1) the alkaloid is a strong base and the indicator a weak, or at most a medium strong acid, or (2) the alkaloid is but a medium strong base, but in its basic property shows a combining tendency approximately equal to that of the acid indicator.

The indicators found most satisfactory in each case are given in the following list of alkaloids, those giving fairly reliable results only being given in brackets: *Morphine* = lacmoid (iodeosine); *Atropine* = uranin, lacmoid, (methyl orange); *Aconitine* = azolithmin; *Veratrine* = lacmoid; *Thebaine* = iodeosine cochineal, (hæmatoxylin); *Codeine* = iodeosine, lacmoid (azolithmin); *Emetine* = iodeosine, cochineal (azolithmin, uranin, hæmatoxylin, lacmoid); *Cocaine* = lacmoid; *Strychnine* = azolithmin (uranin, lacmoid); *Brucine* = cochineal (uranin, lacmoid); *Nicotine* = lacmoid (iodeosine, uranin, cochineal); *Coniine* = iodeosine, cochineal, lacmoid (methyl-orange, azolithmin); *Sparteine* = hæmatoxylin (uranin); *Quinine* = azolithmin, hæmatoxylin; *Pelletierine* = cochineal (iodeosine, lacmoid); *Papaverine* = lacmoid; *Narcotine* = lacmoid (methyl-orange).—Pharm. Rev., Aug., 1900, 373; from Ztschr. Anal. Chem., *39*, 201.

Alkaloids—Doubtful Value of Picric Acid for their Estimation by Micro-Chemical Methods.—E. Pozzi-Escot has carried out experiments to determine the value of picric acid for the micro-chemical examination of alkaloids, as suggested by Popoff. One per cent. solutions, or saturated

solutions in the case of slightly soluble alkaloids, were treated with picric acid on a glass slip and then examined under the microscope—the experiment being made with strychnine sulphate, cocaine hydrochloride, brucine, atropine sulphate, morphine hydrochloride, codeine, and quinine sulphate. The only picrate which was particularly characteristic was that of strychnine. As to the others, the crystallization took place with difficulty, and the crystals were ill-defined and not characteristic. The author, therefore, concludes that picric acid has not the value as a micro-chemical reagent which Popoff has attributed to it.—Chem. News, May 10, 1901, 226; from Compt. rend., April 15, 1901.

In a second paper, the author gives the results of some micro-chemical examinations of alkaloids with other reagents, and, although he has obtained several interesting reactions, these do not allow of a rigorous toxicological research. With strychnine, chloroplatinic acid gives prismatic plates of a peach color. Auric chloride gives an abundant crystallization of prisms grouped in colonies. Potassium iodide and iodine give abundant crops of crystals of a dark olive-green color and great sharpness. With brucine, platinic chloride gives very small star-like crystals; with quinine, platinic chloride gives little grains which strongly polarize light. Iodine, dissolved in potassium iodide, gives little prisms. Platinic chloride gives, with cocaine, large toothed crystals; gold chloride gives similar crystals. With codeine, mercuric iodide dissolved in potassium iodide gives clusters of almost black crystals. Iodine in iodide of potassium with atropine gives pointed crystals, grouped in twos and crossed, of a black color. Morphine, with the same reagent, gives crystallizations in the form of a thistle head.—Chem. News, May 24, 1901, 252; from Compt. rend., April 29, 1901.

Morphine—Antidotes in Case of Poisoning.—Prof. Albert B. Prescott, at the meeting of the Michigan State Pharmaceutical Association, in Aug., 1900, read a paper on "Antidotes in Cases of Morphine Poisoning," which will be consulted with advantage in the Proceedings of the Mich. Pharm. Association, 1900, pp. 43–48.

Apomorphine Hydrochloride—An Active Hypnotic in Small Doses.—It is stated in "E. Merck's Annual Report" for 1900, that apomorphine hydrochloride in crystals is a very active hypnotic, but care must be taken that the doses are so small as not to cause nausea. The mean hypnotic dose is 2 Mgm., but given subcataneously. Boric acid is antagonistic and must therefore not be added as a preservative.—Pharm. Journ., May 23, 1901, 665.

Apocodeine Hydrochloride—A New Laxative.—It is stated in "E. Merck's Annual Report" for 1900, that apocodeine hydrochloride, when applied subcutaneously in doses of 2 Cc. of a 1 per cent. aqueous solution, produces a laxative effect.—Pharm. Journ., May 25, 1901, 665.

Laudanosine—Production from Papaverine.—Pictet and Athanasesca have obtained laudanosine, $C_{21}H_{27}NO_4$ (O. Hesse), by the reduction of papaverine chlormethylate with zinc and hydrochloric acid. The product is described as presenting great resemblance to the natural laudanosine, discovered by Hesse, but differing in being optically inactive. By conversion into quinate, methyl-tetrahydro-papaverine can be split up into two oppositely active compounds, of which the dextro-rotary modification proved to be identical with the laudanosine of opium. A. Babel states that inactive laudanosine is much more toxic than papaverine, being in that respect similar to thebaine. On the contrary the narcotic action is scarcely recognizable, though papaverine is to a slight extent narcotic.—Pharm. Journ., Nov. 24, 1900, 572; from Berichte, *33*, 2346 and Rev. Med. de la Suisse, *19*, 657.

Quinine Arsenate—Preparation.—Guigues has obtained quinine arsenate in the form of fine, colorless, silky needles by adding a dilute solution of arsenic acid to hydrated quinia, suspended in water and gently warmed until a distinct acid reaction is obtained. Very dilute ammonia is then added to the warm solution until perfect neutrality is attained. The liquid is then allowed to cool, and the salt crystallized. The resulting crystals contain 71 per cent. of quinia alkaloid.—Pharm. Journ., Mar. 9, 1901, 289; from Répertoire, *13*, 52.

Quinine Salicylate—Solubility.—P. W. Squire has made some experiments to determine the solubility of quinine salicylate in order to settle a controversy on the subject that had recently appeared in the "British and Colonial Druggist." The experiments were made on a sample obtained from a well known manufacturer, and on one made in the author's own laboratory. A given weight of the salt was shaken with a given measure of water at a given temperature for three days; the ratio of salt to water varied from 1 in 240 to 1 in 650, and the temperatures varied from 15.5° to 30° C. in the different experiments. In no one instance did the salt completely dissolve, and the solutions were therefore filtered; a portion of the filtrate was evaporated to dryness, and another portion titrated with decinormal soda. The results obtained were not so concordant as could have been wished, but one point was clearly demonstrated, and that is that no figure was obtained, under any of the conditions, which showed a solubility below that of 1 in 100.—Bull. Pharm., Nov., 1900, 460; from Brit. & Colon. Drugg.

Quinine Acetyl-Salicylate — Characters. — Zimmer & Co. describe quinine acetyl-salicylate as a white crystalline substance, having a bitter taste, a slight odor of acetic acid, and the following composition: $C_{20}H_{24}N_2O_2.C_6H_4.O.C_2H_3O.COOH$. The acetous odor is apparently due to the decomposition of the acetyl-salicylic acid. — Pharm. Ztg., Feb. 13, 1901, 131.

Quinine Glycerophosphate—Preparation and Composition. — According to Prunier, glycerophosphate of quinine is best prepared in the following manner: A saturated solution of glycerophosphate of lime is gradually added to a solution of oxalic acid at about one-twentieth, and carefully stirred; a slight excess of the glycerophosphate must be finally added; this is left for some hours before filtering, so as to precipitate the whole of the oxalic acid. To the clear filtrate a slight excess of hydrate of quinine, suspended in water, is gradually added; this is left until it gives an alkaline reaction with litmus. After saturation in the cold, the whole is brought to boiling to dissolve the salt, and to separate the excess of insoluble quinine by hot filtration. On cooling, an abundant crop of crystals of basic glycerophosphate of quinine is obtained. Under these conditions the salt contains 5 molecules of water, which it gradually loses when the temperature is raised; above 60° it turns brown, and commences to decompose. Its composition is shown to be: quinine 70 parts, glycerophosphoric acid 19 parts, water 11 parts. — Chem. News. Dec. 28, 1900, 315; from Journ. Pharm. Chim. [6], xii., No. 4, 272.

Quinine Glycerophosphate—Estimation.—Prunier gives the following method for the estimation of the components of glycerophosphate of quinine: Two Grms. of the glycerophosphate are dissolved by means of 10 or 15 Cc. of $\frac{N}{10}$ nitric acid, and precipitated by a sodic solution containing about 6 Grms. of alkali. Filter and wash the quinine on the filter, dry at 110°, and weigh. The total filtrate, carefully measured, is divided into two equal parts. The first, used for the estimation of the acid, is supersaturated with nitric acid after the addition of 2 or 3 Grms. of saltpetre, then evaporated to dryness under a funnel. Then proceed as above, by repeated additions of nitric acid, to obtain first a white ash, and then the melted mass which contains the whole of the phosphoric acid. The other half of the solution serves to complete the estimation of the quinine. For this purpose more alkali is added; then boil so long as a white pearly matter separates out; this is collected on a filter. The filtrate is again boiled, and when no more than a slight cloudiness is formed, shake up with about 50 Cc. of ether and chloroform to remove the last traces of saponified quinine. Wash, dry and weigh, and in this manner a second quantity of quinine is obtained, which, added to the portion of quinine precipitated in the cold, gives the percentage of the alkaloid present.—Chem. News, March 22, 1901, 143; from Journ. Pharm. Chim. (6) xii., No. 7.

Chininum Lygosinatum—A New Bactericide.—Prof. Fábinyi has announced before the Hungarian Academy of Science the discovery of a new bactericide, which he calls "Chininum lygosinatum." It is prepared from sodium lygosinate, which is nothing else than a sodium salt of the *diorthocumarine-ketone.* The quinine lygosinate is described as a fine

powder, of an orange-yellow color and faint aromatic odor. It is at first tasteless, afterward becoming bitter; is sparingly soluble in water, easily soluble to the amount of 15 per cent. in alcohol, 5 per cent. in oil, and also readily soluble in benzin and chloroform. It is decomposed by acids and alkalies, melts at 114° C., and burns completely on platinum foil with development of a bitter almond odor. Bacteriological experiments made with the new substance show it to be a powerful bactericide, and that it is particularly adapted for the preparation of bandagings, which are easily impregnated with it by dipping the material in its alcoholic solution and drying.—Pharm. Ztg., July 25, 1900, 569; from Pharm. Rundsch., 1900, No. 29.

Cocaine—Estimation as Di-iodo-cocaine Hydriodide.—W. Garsed and J. N. Collie have communicated the result of their researches undertaken with the object of finding a method for the fairly accurate estimation of cocaine in small quantities, either when free or mixed with benzoyl ecgonine and ecgonine, the products of hydrolysis of pure cocaine. The estimation of cocaine in presence of cinnamyl cocaine and isatropyl cocaine, and other substances with which it is associated in coca leaves has, however, not been attempted. When a solution of cocaine in the form of a salt containing about 1 per cent. of cocaine base is titrated by adding excess of decinormal iodine solution till the supernatant liquid contains excess of iodine, a precipitate of

Di-iodo-cocaine Hydriodide, $C_{17}H_{21}NO_4HI_2$, is formed. The excess of iodine in solution can then be estimated by a decinormal sodium-thiosulphate solution. The precipitated di-iodo-compound can be collected and weighed, or the cocaine estimated by the amount of iodine used. Any cocaine salt can be used, since the potassium iodide in the solution reacts with the salt, producing the iodide. Di-iodo-cocaine hydriodide is a remarkably stable and crystalline compound, crystallizing in large glistening crystals of constant composition. Cocaine can be estimated in presence of ecgonine, as ecgonine forms a soluble iodo-compound. Benzoyl ecgonine, however, interferes to a considerable extent with the estimation of cocaine. Making use of the fact that both benzoyl ecgonine and ecgonine are insoluble in ether or light petroleum, a separation can be effected, as cocaine is soluble in both these solvents. The extracted cocaine can then be weighed directly or titrated with iodine.—Chem. & Drugg., May 4, 1901, 741; from Proc. Chem. Soc., *17*, 89.

Strychnine—Critical Review and Investigation of the B. P. Process for its Assay in Preparations of Nux Vomica.—E. H. Farr and R. Wright comprehensively review the B. P. process for the assay of the preparations of nux vomica which was devised by Dunstan and Short in connection with their research on the chemistry and pharmacy of nux vomica, the details of the process, as given by the authors, being as follows: "Any quantity

less than 0.2 Gm. mixed alkaloids * is dissolved in 10 Cc. of 5 per cent. (by volume) sulphuric acid, the solution diluted to 175 Cc. with distilled water, and the volume adjusted to 200 Cc. with a 5 per cent. solution of potassium ferrocyanide. The liquid is transferred to a beaker, stirred occasionally, and allowed to stand for six hours. The precipitate is filtered off and washed with water containing 0.25 per cent. of sulphuric acid, until the washings are free from bitterness. It is then decomposed with strong ammonia water, the filter washed with the same liquid and finally with chloroform, a sufficient quantity of which is used to extract the alkaloid from its solution in ammonia hydrate. The chloroformic solution is evaporated and the anhydrous strychnine weighed."

Schweissinger having reported unfavorably on the method, mainly on the ground that the results always give too high a figure for strychnine, these being largely dependent upon the concentration of the liquid and the time occupied in the precipitation, the authors have made a series of experiments, both in summer and winter, to determine the character of the precipitate obtained from the strychnine and brucine solutions by potassium ferrocyanide, and the solubilities of these in water acidulated with sulphuric acid, and have obtained results which lead them to the following conclusions and recommendations:

(1) The assay process of the B. P. gives results which, though not absolutely accurate, are sufficiently so for all practical purposes.

(2) The volume of liquid taken should not exceed 5 Cc. liquid extract, or 30 Cc. tincture.

(3) 200 Cc. of wash water at a stated temperature, preferably 100° F. (38.0° C.), should be employed, and a correction made for strychnine dissolved.

(4) In carrying out the process, the pharmacopœial instruction as to simple agitation without stirring, and as to the length of time allowed for precipitation of the strychnine, are to be strictly observed, as success depends altogether upon the conditions under which the process is carried out. — Trans. Brit. Pharm. Conf., 1900, 440–450.

Strychnine—Avoidance of Decrepitation in the Assay of Liquid Extract of Nux Vomica, B. P.—F. C. J. Bird observes that decrepitation of the strychnine crystals, accompanied by a crackling sound and violent projection of fragments, is a phenomenon almost invariably attendant on the last stage of the evaporation of the chloroformic solution of strychnine obtained in the official (B. P.) process for the assay of liquid extract of nux vomica. The B. P., in order to guard against loss of alkaloid from this cause, prescribes a current of warm air for the removal of the chloro-

* The alkaloids obtained by the shaking out process, which is sufficiently familiar. When the B. P. quantities of liquid extract or tincture are used, the amount of alkaloids is greatly in excess of the quantity given as the maximum by Dunstan and Short.—Rep.

form, the residue being finally dried in a covered dish by exposure to the heat of the water-bath. While these directions can easily be followed by the practical analyst in his well-equipped laboratory, the occasional worker must make up by vigilance what he lacks in appliances, and doubtless often meets with disappointment and loss. The author has, therefore, searched for an expedient whereby these special precautions might be avoided. It seemed to him that the property which amylic alcohol is known to have in retarding the crystallization of belladonna alkaloids from chloroformic solution might also be utilized in this case. On dissolving strychnine in varying proportions in chloroform and adding small quantities of amylic alcohol, the evaporation could be conducted to complete dryness, without extra precautions, within twenty minutes. In the experiments described 200, 300 and 400 Mgm. of the alkaloid, respectively, were dissolved in 15 Cc. chloroform, 2 Cc. of amylic alcohol added, and evaporated in open dishes (10 Cm. diam.). No decrepitation occurred, and the residue in each case weighed exactly 200, 300 and 400 Mgm. In a parallel experiment, with 200 Mgm. strychnia, in which no amylic alcohol was used, violent decrepitation occurred, and the residue weighed only 91 Mgm.—Pharm. Journ., Sept. 8, 1900, 286.

Strychnine—Supposed Precipitation in a Mixture Containing Bromides —Wm. Martindale calls attention to statements sometimes made that a mixture containing: Hydrobromic acid, ♏xv; Liq. strychnine ♏iv; Liq. Hyoscin. hydrobrom (1 : 1000), ♏ij; Lith. Brom., grs. xij; Syr. Aurant ♏xx; aqua ad ℥ss. is incompatible, producing a "sandy" precipitate on standing, which is supposed to contain all the strychnine. He finds this to be groundless. Properly prepared with pure ingredients, the mixture remains clear. Any precipitation observed is possibly due to impurity in the lithium salt.—Pharm. Journ., Oct. 6, 1900, 589.

In a paper on crystallization of salts from acidified solutions, in which he points out the liability of certain salts to crystallize out from their aqueous solutions on the addition of acids, A. J. Cownley refers to the foregoing observations of Mr. Martindale, and calls attention to the fact that while in this particular case there is hardly any possibility of any separation of strychnine from this cause, this fact should not be lost sight of, that strychnine hydrochloride does separate from acidulated solutions if present in sufficient quantity, and that it is less soluble in an acidulated liquid than in water.—Pharm. Journ., October 27, 1900, 465.

Strychnine—Invalidation of the Chromic Acid Test by Lloyd's Morphine-Hydrastine Reaction.—The remarkable reaction of a mixture of morphine and hydrastine when the well-known chromic acid test for strychnine is applied, first brought to notice by Prof. J. U. Lloyd in his novel "Stringtown on the Pike," has given rise to considerable controversy, both as to the test itself, its bearing on the forensic determination of strychnine, and the reliability of expert testimony in general. These controversies, of

course, cannot be followed in this report, but the opportunity is taken to call attention to this reaction by quoting from a paper by Mr. S. W. Williams (Drugg. Circ., Febr., 1901, 28), in which he takes the editor of a drug journal to task for an attack on expert testimony, grounded on the observation of Prof. Lloyd that identical results are obtained with strychnine and with a mixture of morphine and hydrastine when the chromic acid test is applied. Concerning this reaction Mr. Williams says that if any one will apply the test to strychnine, the color reaction will come out brilliantly; but the same test applied to a mixture of one part of hydrastine (white alkaloid) and four parts of morphine may fail to come up to expectations. Morphine, acting as a strong reducing agent, would naturally be expected to cause a green to appear through a reduction of the chromic acid. Hydrastine contributes a red. The purple color produced by the mixture of the two alkaloids, which so closely resembles the initial color of the strychnine reaction, is, indeed, remarkable, and a most interesting discovery; but it may be added that tests made with a mixture of the pure alkaloids (hydrastine 1 and morphine 4), as compared with strychnine, were readily and positively differentiated by a seven-year-old boy. In fact, it is difficult to see how any one could mistake one for the other. But let us suppose that the reactions are identical. This signifies very little, if the hydrastine and morphine do not appear at that stage in the analytical process where strychnine would be found if present. Just what process would have been employed in the "seventies" which would carry morphine through to the point where strychnine would be looked for is not stated; but if chloroform were used, as it naturally would be now-a-days, we have to consider the relative solubility of the alkaloids in that fluid—according to Wormley, 1 to 6500 for morphine (practically insoluble in the presence of an alkali) and 1 to 8 for strychnine. It is obvious, therefore, that morphine would not be extracted by the chloroform and consequently would not be present in the residue which in ordinary procedure would be tested for strychnine. What likelihood then is there for a chemist, in the usual course of analysis, to mistake a mixture of hydrastine and morphine for strychnine when the morphine should have been eliminated in an earlier stage of the process and cannot be present at the point where the test for strychnine is made?

J. C. Wharton, referring to Mr. Williams' paper, states that his own experiments fully corroborate the observations made by the latter concerning the failure of the mixture of hydrastine and morphine to act in the characteristic manner that strychnine does when the chromic acid test is applied. The initial color of strychnine is blue, and this blue color is *very evanescent*, so much so as to "flash" out of sight if not carefully looked for, and in no case lingering long before giving way to the succession of colors, purple, red, yellowish, etc. On the other hand, the mixture of hydrastine and morphine (1 to 4) has never, in the author's hand, shown

the initial blue, but rather a brownish color, passing, when they were present in considerable amount in the mixture of dichromated plaster of paris, with which the tests were made, rather slowly into a *persistent* greenish color, then a dark greenish-blue or blue, a peculiar purplish color not well difined sometimes showing itself. But the author does not think that a red color ever manifested itself when the dichromated reagent and mixed alkaloids were combined by trituration and tested by dropping the mixture in strong sulphuric acid, as was done in the author's experiments. Mr. Wharton, however, has gone a step further than Mr. Williams, and has thus confirmed the opinion of the latter that the chromic acid reaction for strychnine could not be obtained if the hydrastine and morphine were carried through the analytical process required in actual practice in a given post mortem investigation. His experiments were made somewhat as follows: The mixed alkaloids were placed in a suitable beaker or test tube, distilled water added, and the liquid rendered alkaline with ammonia water and extracted with chloroform in the usual way. The chloroformic extract was taken out with a pipette and evaporated to dryness at a very gentle heat, in a watch-glass containing a small amount of the dichromate of potassium and plaster of paris (1 : 99) reagent. The dried powder was tested by placing a small portion in strong sulphuric acid contained in a small white porcelain vessel. The initial color was brownish, almost instantly turning to a *persistent* red, which gradually faded away without giving any other tint except the natural orange and yellowish colors due to the vanishing red, the reaction being indicative of *hydrastine*. In a second experiment the residue remaining after extracting with chloroform was the object of examination. It was eventually obtained in crystals, and gave the reactions for *morphine*.—Drugg. Circ., March, 1901, 48.

Strychnine—A Bromine Test Supplementary to the Dichromate Test.—In a previous paper, J. C. Wharton had called attention to the color reaction produced by the vapor of bromine on strychnine dissolved in sulphuric acid contained in a porcelain capsule. Further experiments have confirmed the utility of the reaction, which may be carried out as follows:

Place the substance, in a dry condition, or in chloroformic solution, in a small test tube and insert the small tube into a larger test tube containing boiling hot water, to evaporate the chloroform, if present. On the dry or nearly dry substance in the small test tube place a few drops of a mixture of equal volumes of strong sulphuric acid and water; replace the small tube in the hot water contained in the larger tube, and dissolve the residual extract or substance supposed to contain strychnine in the acid by agitating it in the small tube, which may be conveniently removed from and returned into the hot water as occasion may require. After solution of the substance in the acid, incline the mouth of a small vial containing bromine over the mouth of the small test tube, in such a way as to fill the tube with the vapor of the bromine, shake the tube so that the acid solu-

tion may absorb the vapor of bromine, and replace the tube in the water, keeping the water boiling hot, but not necessarily boiling, while the excess of bromine vapor is expelled from the acid solution in the small test tube. If the strychnine is present in considerable amount, a crimson color will probably begin to appear in a few minutes, deepening in intensity as the excess of bromine is evaporated. If the color does not appear when the bromine has sufficiently evaporated, repeat the application and evaporation of bromine vapor as at first, until numerous trials show whether or not a crimson color will result from the test. A few trials with known strychnine as a blank or check experiment will give a good idea of the details. In case the amount of strychnine is small, but little bromine vapor should be introduced into the tube at a time, as too much will destroy the color entirely.—Drugg Circ., April, 1901, 72.

Aconitine and Caffeine—Estimation as Periodides.—Referring to his previous observations concerning the complexity of the reactions between alkaloidal salts and iodine-potassium iodide solutions, C. Kippenberger communicates the results of experiments made with aconitine and caffeine, which show that not only does the amount of "addition iodine" absorbed vary with the conditions of the experiment, but that also the amount of potassium iodide, or hydrogen iodide, which disappears during the experiment, is variable. Caffeine and aconitine may, however, be estimated with iodine-potassium iodide solution of any concentration, preferably about twentieth normal, if the solution used is first standardized upon weighed quantities of the alkaloids. With caffeine a large excess of iodine solution must be added for complete precipitation. Aconitine can be estimated more accurately by titration with volumetric acid solution, using azolitmin, iodoeosin, haematoxylin or cochineal as indicator.—Pharm. Rev., Nov., 1900, 523; from Ztschr. f. Anal. Chem., *39*, 435.

Caffeine-Ethyl-Iodide—Preparation and Characters.—A. Rossolimo finds that caffeine-ethyl-iodide, $C_8H_{10}N_4O_2.C_2H_5I$, may be easily obtained by heating caffeine with excess of ethyl iodide in a sealed tube for twenty hours at a temperature of 160–170° C. It is crystallized from alcohol and has a melting point of 182–183° C., is soluble in water and alcohol, but insoluble in ether, benzene, chloroform, petroleum ether, and carbon disulphide. When dry it is stable, but water decomposes it.

Caffeine-Ethyl-Chloride, $C_8H_{10}N_4O_2.C_2H_5Cl$, is prepared by the action of silver chloride upon the iodine compound. Colorless plates or fine rods crystallize out, having a melting point of 182–183° C. The platinic chloride $(C_8H_{10}N_4O_2.C_2H_5Cl)_2PtCl_4$ is an easily decomposed orange powder, whereas the aurichloride $C_8H_{10}N_4.O_2C_2H_5.AuCl_3$ is, on the contrary, very stable.—Pharm. Journ., April 20, 1901, 485; from Chem. Centralblatt, *72*, 401.

Caffeine Sodio-Benzoate, Theobromine Sodio-Salicylate, etc.—Constitu-

tion of their Solutions.—Dr. Paul has made some preliminary studies undertaken for the purpose of determining the constitution of the easily soluble compounds formed when the solution of caffeine, and particularly of the sparingly soluble theobromine, is effected by the aid of sodium benzoate or sodium salicylate. The present investigation leads him to suppose that the compounds formed are not simply double salts, but that they are of a very complex molecular character, the precise nature of which must be the subject of further experiment.—Pharm. Ztg., Sept. 26, 1900, 744.

Alkaloids of Belladonna — Assay in the Leaves and Root and their Preparations.—In continuation of his comprehensive work on the alkaloidal assay of ipecacuanha (see Proceedings, 1900, 821), belladonna, and nux vomica, F. C. Bird concludes the portion on "belladonna," in which he gives in great detail the methods applicable to insure reliable results in the instance of the individual preparations, such as the solid and fluid extracts of the leaves and root, the ointment, liniment, suppositories, etc. Certain modifications of solvent and precipitant appear to be necessary in each individual case in order to secure accuracy and to facilitate the extraction, and particularly that of shaking out the alkaloid; these are too numerous to find place here. The following process for the assay of the *Extractum Belladonnæ Folii Alcoholicum, B. P. C.*, may serve to give an insight into the character and thoroughness of the author's work:

Alcoholic extract of belladonna leaves ..... 2.5 Gm.
Potassium carbonate ..... 10 Gm.
Water ..... 15 Cc.

Weigh the extract on a tared watch-glass and transfer to a small mortar, rinsing off the last portion of extract with a little of the water. Rub to a smooth liquid, adding more water if necessary, and transfer to a separator. Wash out the mortar with the remaining water, and add the washings together with the carbonate of potash to the contents of the separator. Shake until the salt is dissolved, then add

Solvents { Amylic alcohol ..... 3 vols.
Chloroform ..... 1 vol.
Ether ..... 4 vols. } 20 Cc.

Warm and agitate vigorously. Separate the ethereal layer, run off the aqueous portion, and add

Solvent ..... 10 Cc.

to the resinous clot, which will generally be found adherent to the interior of the separator. Warm and agitate until the clot is completely disintegrated. Return the aqueous layer to the separator, agitate and again separate. Continue with two successive quantities of

Solvent ..... 10 and 5 Cc.

Wash the mixed ethereal liquids with

Sol. potassium carbonate (1 in 2) ..... 5 and 2 Cc.

Run off, reject and displace the last traces with 1 Cc. of water, added without agitation.

Extract the alkaloids with

Normal sulphuric acid.....5 Cc.
Water.....5 Cc.

And repeat with three successive quantities of

Water.....5, 5 and 5 Cc.

Wash the mixed acid liquids with

Chloroform.....3 and 3 Cc.

Run off and reject the chloroform (which removes a little chlorophyll), render alkaline with

Solution of ammonia.....*q. s.*

and shake out the alkaloids with four successive quantities of

Chloroform.....10, 5 and 5 Cc.

aiding the separation of the chloroform if necessary by the addition of a few Cc. of a saturated solution of ammonium carbonate. Evaporate in a tared dish, dry, weigh and titrate as usual, multiplying the result by 40, to obtain the percentage of alkaloids.

Although from the description the foregoing process appears lengthy, it is in reality one which can be quickly performed, as the separations are immediate and there is no emulsification.—Pharm. Journ., Aug. 11, 1900, 195–197 (et ante, vol. *64*).

Sanguinarine Nitrate — Nature of the Article of Commerce. — Having occasion to prepare some pure alkaloidal sanguinarine for the purpose of study and comparison with the alkaloid of *Bocconia cordata* (see Proceedings, 1900, 128), J. O. Schlotterbeck at first endeavored to prepare it from the commercial extract of sanguinaria, which, according to the claims of manufacturers, should contain from 8 to 17 per cent. of alkaloid. To his astonishment, however, the yield was less than 1 per cent., showing that decomposition had probably taken place during the process of manufacture. Turning his attention then to the commercial product called "sanguinarine nitrate," he secured three specimens for the recovery of the free alkaloid sanguinarine. All were in powder form, but they varied in color from an orange red to a dull terra cotta. By suitable methods described, the author finally obtained from these specimens a pure white product, well crystallized, but this, instead of producing blood-red salts with acid, produced with sulphuric and nitric acids salts of a bright lemon-yellow. As the names are understood among chemists, this alkaloid is therefore chelerythrine and not sanguinarine. But the author expresses the opinion that this alkaloid, being evidently in preponderance, should be called sanguinarine, in place of the alkaloid now so called, which is present in much smaller quantity. As regards the commercial product called "sanguinarine nitrate," the three specimens examined are shown by the author's experiments to be either pure chelerythrine, or a mixture of all the alkaloids, with more or less decomposition products. In the mother liquors from which the pure white alkaloid had been crystallized, traces of protopine and homochelidonine could be separated and identified. — Pharm. Rev., Aug., 1900, 358–362.

Berberine Phosphate—Composition.—The uncertainty concerning the ultimate composition and formula for berberine phosphate, has induced Frank Shedden to undertake a series of investigations in order to definitely establish its composition if possible. This salt has heretofore been the subject of investigation by several experimenters since its introduction by Dr. T. L. A. Greve about the year 1877—among these Parsons and Wrampelmeier, Wilmarth, Schmidt, and Coblentz, formulas being given by all except Wilmarth, whose product was, however, analyzed by Parsons, and a formula assigned to it. For the present investigation, the author prepared berberine phosphate by the interaction of berberine acetone (a compound which is easily obtained pure) with phosphoric acid, and recrystallizing the product. The salt thus prepared was of a bright yellow color. It did not increase in weight even in a damp atmosphere. The crystallized salt is soluble in 14.3 parts of water at 16° C.; the dehydrated salt in 15 parts of water—obtained by heating the crystallized salt to constant weight at 110° C.—is soluble in 15 parts of water at 15° to 16° C. Subjected to analysis by a process described, the correctness of which was confirmed by control experiments, the berberine phosphate obtained in this way, as well as that obtained by double decomposition of berberine sulphate and acid calcium phosphate (carefully purified), had the composition: $C_{20}H_{17}NO_4.2H_3PO_4$—the crystallized salts containing varying amounts of water of crystallization. These figures agree with the formula given by Parsons in his analysis of the pure salt prepared by Wilmarth, but, as was anticipated, disprove the formula $C_{20}H_{17}NO_4.7H_3PO_4 - 4H_2O$, assigned by Parsons and Wrampelmeier to a salt prepared by the interaction of berberine sulphate and calcium, a discrepancy which is doubtless due to impurity carefully eliminated in the salt obtained by the present author by the same interaction.—Trans. Brit. Pharm. Conf., 1900, 507–513.

Hydrastinine Hydrochlorate—Therapeutic Uses.—It is stated in "E. Merck's Annual Report" (for 1900) that hydrastinine hydrochlorate has been found useful in the treatment of heart disease, a slow but permanent effect being produced in acute and chronic aortis and in arterio-sclerosis, by the use of the following mixture: Hydrastinine hydrochloride, 0.10 Gm.; sodium iodide, 2.5 Gm.; anise water, 100.0 Gm.; distilled water, 150.0 Gm.; syrup, 50.0 Gm. Dose: two tablespoonfuls in the morning. If a prompt action be required, 0.5 to 1.0 Cc. of a 10 per cent. aqueous solution should be injected twice daily.—Pharm. Journ., June 8, 1901, 725.

Cytisine—Preparation and Characters.—A. Rannerda purifies the crude cytisine, obtained from the seeds of *Cytisus Laburnum*, L., by the well-known shaking-out process with chloroform, by distilling it in a partial vacuum. Under a pressure of 2 Mm. and a temperature of 228° C., the alkaloid distills over as a colorless liquid and congeals in the receiver in form of fine crystalline needles. It crystallizes from absolute alcohol in

form of small transparent rhombic columns, which have the sp. gr. 1.0046. The author has also prepared and studied several alkyl derivatives of the alkaloid, namely, *methyl-, ethyl- and cetyl-cytisine.* These are obtained by heating the powdered alkaloid with the corresponding iodides under pressure, decomposing the purified double iodide by means of caustic soda or potassa, extracting the mixture with ligroin and crystallizing from alcohol, chloroform, etc.

Methyl-Cytisine forms colorless crystals, which are needle-shaped, columnar, or tabular, according to the solvent employed.

Cetyl-Cytisine is obtained from alcoholic solution in form of small white needles, which melt at 55°–56° C., while

Ethyl-Cytisine appears to be incapable of crystallizing, being a yellow, nearly colorless fluid of syrupy consistence.—Apoth. Ztg., July 18, 1900, 486; from Ned. Tijdschr. voor Ph. Ch. En. Tox., June, 1900.

Damascenine—Chemical Formula and Characters.—Schneider has attributed the formula $C_{10}H_{15}N_3O$ to damascenine—the alkaloid of *Nigella damascena*, but this has now been reinvestigated by H. Pommerehne, who finds the formula $C_9H_{11}NO_3$ to be more correct for this base. The free alkaloid forms pale yellow prisms having a bluish fluorescence, and melting at 26° C. Ultimate analyses of numerous salts support the author's revised formula.—Arch. d. Phar., *238* (Sept. 26, 1900), 531.

Cynoglossine—Occurrence in a Number of Boraginaceæ.—According to the investigations of K. Greiner, a number of plants belonging to the Boraginaceæ contain a poisonous alkaloid, cynoglossine, viz., *Cynoglossum officinalis, Anchusa officinalis, Echinum vulgare*, while *Symphytum officinalis* also contains a toxic alkaloid, which, although similar in chemical constitution, differs in its physiological action, and has therefore been named

Symphyto-cynoglossine. In addition to these bases, all the plants named contain a notable quantity of chlorine, and they also yield a toxic glucoside,

Consolidin, which, when hydrolyzed with acids, splits up into glucose and an alkaloid

Consolicine. Cynoglossine forms double salts with mercuric and platinic chloride, which, as also the hydrochloride of the base, are crystalline. Physiologically it acts similarly to curare, paralyzing the peripheral nervous system, while "symphyto-cynoglossine" paralyzes the central nervous system. The latter effect is also produced by the alkaloid "consolicine," which is thrice as potent as the glucoside "consolidin," from which it is split by hydrolyzation.—Arch. d. Pharm., *238* (Sept. 26, 1900), 505–530.

Nicotine—Determination in Tobacco.—Jules Foth determines nicotine in tobacco as follows: 6 Gm. of the dry powdered tobacco leaves are

moistened with 10 Cc. of 20 per cent. soda solution; after thorough mixing, sufficient plaster of paris is added to the magma to convert it into a dry powder. This is transferred to a well-stoppered glass cylinder and macerated for an hour, with occasional agitation, with 100 Cc. of a mixture of equal parts of ether and petroleum ether. Twenty-five Cc. of the ethereal liquid is then withdrawn, 40 Cc. or 50 Cc. of distilled water added to it 1 drop of iodeosine, followed by a known quantity in excess of $\frac{N}{10}$ sulphuric acid. The amount of free acid is then titrated back with decinormal soda, and the amount combined with the nicotine thus determined by difference.—Pharm. Journ., June 15, 1901, 747.

Glucamine—A New Base Derived from Glucose.—Starting from the aldose oxime, $C_nH_{2n}O_5$, a whole series of primary bases of the form $C_nH_n - 2(OH)_{n-1}(NH_2)$, were obtained by L. Marguenne and E. Roux. These are practically distinguished by their great stability and the absence of any action on cupro-potassium solutions. The authors also describe the base derived from ordinary glucose, which they name glucamine, and which is in some measure the type of this new class of compounds.—Chem. News, May 17, 1901, 239; from Compt. rend., April 22, 1901.

Aniline, Toluidine, Pyridine and Quinoline—Formation of Double Salts With Bismuth.—O. Hauser and L. Varino find that double hydrochlorides of bismuth with aniline, ortho- and para-toluidine, pyridine and quinoline are easily obtained by dissolving bismuth oxide and the hydrochloride of the base in alcoholic hydrochloric acid. The *aniline salt* has the formula $Bi_2O,C_6H_5NH_2HCl$, and occurs in small slightly hygroscopic needles. The *ortho-toluidine salt* forms large crystals, that of *para-toluidine* small needles, while the *pyridine double* salt is a white crystalline powder.—Pharm. Journ., Jan. 5, 1901, 1; from Berichte, *53*, 2271.

Acetanilid — Review of Chemical Properties and Tests. — Charles W. Gorr gives in brief synopsis the chemical properties of acetanilid as revealed in the literature of the past thirty years or more, with complete references to his authorities, and, in a second paper, the tests from the same source. The nature of the paper precludes their profitable abstraction, and they must therefore be consulted in the original in Pharm. Review, July, Sept. and Oct., 1900, 304–312, 402–408 and 467–469.

Phenolphthalein and Methyl Orange — Availability as Indicators in Presence of Carbonic Dioxide.—F. M. Alcock states that *phenolphthalein* may be made available as indicator for titrating carbonates and bicarbonates of the alkalies with acid solutions, if the solution is well boiled after each addition of the acid. As the interfering carbon dioxide gas is expelled, the crimson color of the indicator returns until perfect neutralization or slight excess of acid is attained. As to the difficulties experienced in alkalimetric work with *methyl orange* solution B. P., sometimes mentioned by students, this, as pointed out by Sutton, is because they use too

much of this indicator. Operating with 50 Cc. of the solution of alkaline carbonate or bicarbonate, it suffices to dip a thin glass rod to the depth of half an inch into the official methyl orange solution, and to stir the liquid to be treated with it. The official methyl orange solution should be reduced to $\frac{1}{10}$ its present strength and the precise quantity of this to be added in each official test in which it is to be used should be stated.—Pharm. Journ. Oct. 20, 1900, 444.

Urotropine—New Compounds.—L. Vanino and E. Seitter describe several new urotropine compounds, as follows:

Hexamethylene-tetramine dibromo-gallic Acid $(CH_2)_6N_4.C_6Br_2(OH)_3$ is a reddish-yellow powder, having an acid taste, easily soluble in water and alcohol, but with difficulty in ether and chloroform.

Hexamethylene-tetramine-sozoiodolic Acid $(CH_2)_6N_4C_6H_2I_2(OH)SO_3H.H_2O$, forms small odorless white needles, having an acid taste, easily soluble in water, but with difficulty in alcohol, and insoluble in chloroform and ether.

Hexamethylene-tetramine-chloral-hydrate was obtained in two forms, namely $(CH_2)_6N_42CCl_3CH(OH)_2$ and $(CH_2)_6N_43CCl_3CH(OH)_2$. Both products are white crystalline powders, easily soluble in water, less easily in alcohol and chloroform, very difficultly dissolved in ether.

Hexamethylene-tetramine-sulphate $(CH_2)_6N_4H_2SO_4$, forms white leaflets, which are stable when not in contact with the air. Its aqueous solution is acid, and on warming gives off formaldehyde. — Pharm. Ztg., March 6, 1901, 193.

Urotropine — Superiority as a Urinary Antiseptic. — According to P. J. Cammidge, urotropine is much superior to salol, ammonium benzoate, boric acid, guaiacol, naphthalin or resorcin as a urinary antiseptic. The cause of its antiseptic action is not clearly understood, but it does not appear to be due to the formation of formaldehyde, although that compound may be formed from urotropine under various conditions. The author offers the suggestion that acid urine produces in the kidneys practical decomposition of urotropine, by which some body is liberated, which has very marked inhibitory powers over the growth of bacteria; but the acid urine of a person taking thirty grains of urotropine daily was found not to contain free formaldehyde. — Pharm. Journ., Jan. 26, 1901, 79; from Lancet, *160*, 174.

Hydrargyrum Citricum-Ethylenediamine is recommended by Krönig and Blumberg as an antiseptic for disinfecting the hands. It is prepared by dissolving 10 Gm. of mercuric citrate and 4 Gm. of ethylediaminene in 86 Gm. of water. A dilution of 3 parts of this solution to 97 parts of water is said to be superior to a 1 : 1000 solution of corrosive sublimate for the purpose named.—Pharm. Ztg., Feb. 13, 1901, 131.

Camphoric Acid-Phenetidid—Preparation and Characters.—C. Goldschmidt obtains a new compound which possesses antipyretic and antidiaphoretic properties by heating equal parts of camphoric acid and p-phenetidin in sealed tubes at 230° C. A brown, gummy mass results, which yields a white crystalline powder by crystallization from alcohol, and is finally obtained, after seven recrystallizations, in form of satiny-glistening leaflets, melting at 112° C. The composition of this new compound—camphoric acid phenetidid—is $C_8H_{14}.CO.CO.N—C_6H_4OC_2H_5$. It is the opinion of the author that the new compound will prove useful in the treatment of tuberculosis.—Pharm. Ztg., May 29, 1901, 432; from Chem. Ztg., 1901, No. 41.

Methyl Green—Advantageous Use as a Stain.—The fact that most of the elective stains such as ammoniacal fuchsine, although giving excellent results for ordinary microscopical examination by day-light, yet are far from satisfactory when exhibited by lamp-light or thrown on a screen with the lantern, has induced L. Lutz to experiment with other stains. He finds that ammoniacal methyl green, while equaling fuchsine in every other respect, answers admirably for exhibition purposes by artificial light. A saturated solution of methyl green in alcohol (90 per cent.) is prepared, to which ammonia is gradually added until the solution is colorless, and a whitish precipitate is thrown down. Acetic acid is then added, drop by drop, until the precipitate on agitation is just dissolved. The addition of a minute trace more acid will then restore the green color of the reagent. Sections are macerated in this liquid for a few minutes, then washed with water acidulated with acetic acid. The green tint then appears faintly in the elements stained, and becomes intensified on gentle warming.—Pharm. Journ., Dec. 8, 1900, 647; from Bullet. Soc. Pharm., *2*, 124.

Aniline Blue (*Triphenyl rosaniline*)*—Value in Malaria.*—A. Iwanoff's studies have determined that aniline blue, similarly to methylene blue, is an effective anti-malarial remedy, and is so far superior to the methylene compound that it produces a less irritant effect upon the bladder. Aniline blue is a violet blue powder, insoluble in water, but readily soluble in alcohol.—Pharm. Ztg., Mar. 6, 1901, 196; from E. Merck's Ann. Rep. for 1900.

Methylene Blue—Therapeutic Uses.—It is stated in "E. Merck's Annual Report," for 1900, that methylene blue has been used as a remedy for gonorrhœa, three or four capsules, each containing 0.05 Gm., together with one drop of oil of nutmeg and two drops of oil of santal wood, being administered every day for four to seven days. In cases of dysentery, methylene blue has been applied in the form of warm enemas, containing 0.1 to 0.2 Gm. per 500.0 to 1000.0 Gm. of water.—Pharm. Journ., June 15, 1901, 754.

Fluoresceine—Value as an Indicator.—H. Zellner finds that fluoresceine is a particularly useful indicator in alkalimetric determinations of ammonia,

and consequently very serviceable in the determination of nitrogen, by the Kjeldahl method, in highly-colored liquids and in solutions containing carbonates. The indicator is prepared by dissolving fluoresceine 0.4 Gm. in alcohol (90 per cent.) 50 Gm., and diluting with water 30 Gm. The dye should be fresh; samples which have been prepared for some time are less soluble in alcohol and require to be heated to effect solution. From 5 to 10 drops of the solution should be added to the liquid to be titrated, and the containing flask should stand on a black background.—Pharm. Ztg., Feb. 2, 1901, 100.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Adonidin—Therapeutic Uses.—It is stated in "E. Merck's Ann. Rep. for 1900," that adonidin has been prescribed internally in chronic diffuse nephritis, 0.01 Gm. being mixed with 1.5 Gm. of sodium benzoate for a dose, to be repeated in four hours. In cases of nicotine intoxication it is given in doses of 0.005 Gm., mixed with ammonium carbonate, 0.1 Gm., and camphor, 0.03 Gm., thrice daily. It is also administered subcutaneously in angina pectoris, 0.05 Gm. being dissolved in 10.0 Gm. of distilled water, and 1 to 2 Cc. of this solution injected for a dose.—Pharm. Journ., May 25, 1901, 665.

Amygdalin—New Color Reaction.—E. R. Deacon, during some recent experiments conducted on amygdalin, found that on treating this substance with a few drops of concentrated sulphuric acid a bright carmine color developed, which was discharged on pouring into water. A second sample gave the same reaction.—Chem. News, June 7, 1901, 271.

Aloin—Sophistication.—Chas. H. LaWall and Robt. C. Pursel examined a sample of aloin which had a melting point of 82.2° C., and in its behavior to solvents, in its microscopic appearance, &c., resembled powdered aloes pure and simple.—Proc. Pa. Pharm. Assoc., 1900, 161.

Aloin—Isolation and Characters of Several New Kinds.—In continuation of his researches, E. Leger has succeeded in isolating by fractional crystallization from methyl alcohol, an isomer of barbaloin,

Iso-barbaloin, $C_{16}H_{16}O_7$, although not in a state of absolute purity. Its triacetyl-trichloro compound melts at lower temperature (158°–159° C.), and is much more readily oxidized than barbaloin. A new aloin has also been obtained from Natal aloes, which he has named

Homo-nataloin, $C_{15}H_{16}O_7$, and which possesses one CH_2 group less than nataloin $C_{16}H_{18}O_7$. Nataloin is less soluble in methylic alcohol than barbaloin. These two nataloins are separated by repeated fractional crystallization from boiling methylic alcohol, in which homo-nataloin, being less soluble, separates out in hard yellow crystalline crusts, while the more soluble nataloin forms pale yellow, short lamellæ. These two aloins from Natal aloes may be distinguished from the aloins of Barbadoes aloes by the fol-

lowing reactions: The solution in sulphuric acid gives with a particle of dichromate, or of manganese dioxide, a fine green coloration; or a solution in caustic soda, treated with a particle of ammonia persulphate, gradually develops a violet tint. This coloring body dyes silk lilac, but is not fixed on mordanted cotton. *Cape aloes* has afforded the author barbaloin identical with that isolated from Barbadoes aloes, and also another aloin which differs from any previously recorded.—Pharm. Journ., Nov. 10, 1900, 511; from Bull. Soc. Chim., *23*, 785, 792.

Barbaloin—Klunge's Color Reaction not Characteristic.—E. Léger finds that the red color developed on addition of cupric sulphate and sodium chloride to an aqueous solution of barbaloin is not, as regarded by Klunge, characteristic of that aloin at all, but to the accompanying iso-barbaloin; pure barbaloin obtained by repeated re-crystallization does not give this reaction, but the iso-barbaloin thus separated gives an intense violet-red color. Léger goes further, and employs the reagent of Klunge to purify barbaloin from its accompanying iso-compound, heating the aloin with solution and collecting the crystals which separate on cooling. In this way an aloin is obtained which ceases to react with Klunge's solution, and is, according to the author, pure barbaloin. When recrystallized from methylic alcohol, it is of a paler color than the impure aloin; it gives no color reaction either with Klunge's reagent or with HNO_3. Its triacetyl-trichloro-compound melts at 164.8° C. The author is examining Cape aloes, which he finds to contain barbaloin, as well as another aloin differing from those hitherto described by him.—Pharm. Journ., Aug. 18, 1900, 213; from Comptes rend., *131*, 55.

Delphinine—Preparation and Characters.—Dr. J. Katz, in a comprehensive paper read before the Society of German Naturalists and Physicians (September, 1900), after discussing the history of delphinine—first prepared by Brandes in 1819—and the other alkaloids of *Delphinium staphisagria*, describes the difficulties experienced by him in the preparation of the pure alkaloid, and the method by which he eventually overcame them. He found, preliminarily, that when stavesacre seeds were extracted by ether, about 30 per cent. of a dark green oil is obtained, and that the residual drug yields to alcohol about 3 per cent. of a dark brown solid extract. The delphinine is contained exclusively in the ether extract, but by all the ordinary methods tried he was unable to obtain the alkaloid in a condition free from green coloring matter, even the large, well-formed crystals of delphinine obtained by one of the processes retaining the green color pertinaciously. Remembering the statement in the literature that delphinine is precipitable from its solutions by potassium sulphocyanide, the author called this reagent into requisition and found it useful—not as a precipitant of the alkaloid, however, but as a precipitant of the associated coloring matter and impurities. Briefly his method may be outlined as follows: Extraction of the green oily ex-

tract by shaking out with solution of tartaric acid. Addition of potassium sulphocyanide to the acid solution, whereby a flocculent reddish precipitate is produced, leaving the greater part of the delphinine in colorless solution. Then, after rendering the colorless filtrate alkaline, shaking out with ether, which yielded nearly colorless delphinine on evaporation, and finally in handsome colorless crystals by two crystallizations from alcohol. The yield from 50 kilos of the seeds was about 30 Gm. of the chemically pure alkaloid, from which the author has prepared the sulphate, hydrochloride, bromide, acetate and oxalate, none of which were obtainable in crystals either from their water, alcohol, methyl-alcohol, acetone or chloroform solutions. The platino-chloride, on the other hand, was obtained in the form of yellow glistening needles. For the present the author abstains from giving a formula for the pure alkaloid. The platinum double salt contains about 13.5 per cent. Pt., and preliminary experiments point to 590 as the molecular weight of delphinine. Hydrolytic experiments, although incomplete, seem to indicate that delphinine partakes of the nature of a compound ether, benzoic acid being split off both from its acid and alkaline solutions.—Pharm. Ztg., Sept. 22, 1900, 735–736.

Digitoxin—Preparation of Permanent Solutions.—It is stated in "E. Merck's Ann. Rep.," for 1900, that digitoxin dissolves completely in the fluid originally proposed by Petit for dissolving and accurately dosing alkaloids. That consists of a mixture of glycerin (sp. gr. 1.25), 333 Cc., alcohol (95 per cent.), 147 Cc., and distilled water, sufficient to make 1000 Cc. The specific gravity of the mixture at 15° C. should be identical with that of distilled water. If digitoxin be dissolved in this medium (1 Mgm. in 1 Cc.), the solution will keep for an indefinite period.—Pharm. Journ., June 1, 1901, 702.

Digitoxin—Physiological Activity.—Parallel experiments made by Dr. E. Zeltner with infusion of digitalis and digitoxin (crystallized—Merck) prove the latter to be fully equal in its effects to the infusion as regards promptness, energy and duration, and in some cases even superior in these respects. The digitoxin was administered by the mouth in doses of one-fourth of a milligram (in form of tablets) after meals, being more acceptable to a full than empty stomach. While not quite so prompt in its action when given by the mouth, its effects are quite as certain as when it is given subcutaneously or per rectum. The gastric disturbances produced by digitoxin, as well as the danger from its toxity, are no greater than when the infusion is given.—Apoth.-Ztg., July 7, 1900, 464; from Münch. Med. Wochschr., 1900, 886.

Emodin—Percentages in Cascara, Frangula, Rhubarb, and Aloes.—In connection with their determination of the percentage of emodin in the different kinds of *Senna* (which see under "Materia Medica"), Tschirch

and Hiepe have made the following determination of this body in other drugs containing it: Frangula bark, 2.6 per cent.; Cascara sagrada, 0.61 per cent.; Rhubarb root, 1.5 per cent.; Cape aloes, 0.8 per cent.—Phar. Ztg., Feb. 6, 1901, 117.

Frangulic Acid and Emodin-Glucoside—The Water-Soluble Active Constituents of Frangula, Cascara and Rhubarb.—In former investigations (see Proceedings, 1900, 837) D. Eugene Aweng has shown that frangula bark, cascara bark, and rhubarb contain two groups of active constituents, the one group consisting of primary glucosides, readily soluble in water, the other group of secondary glucosides, which are sparingly soluble in water; but both groups are completely extracted from the drugs containing them by 70 per cent. alcohol. In the present paper, Dr. Aweng points out that the primary glucoside in frangula bark consists of frangulic acid alone, while in cascara bark and rhubarb root—both Chinese and rhapontic—there is in addition to frangulic acid a glucoside which when hydrolized splits off emodin. Of the secondary glucosides, he has investigated those of frangula bark. These are composed to the amount of about two-thirds of emodin, chrysophanic acid, frangulin, and an insoluble emodin-glucoside, the remaining one-third remaining to be determined. The secondary glucosides of cascara and rhubarb have not yet been investigated.

If the extraction of frangula bark obtained with 70 per cent. alcohol is evaporated on the water-bath to a thin liquid and then treated with cold water, the primary glucosides are dissolved, while the secondary glucosides separate out in the form of a brown powder; but during the evaporation a portion of the primary glucosides becomes insoluble and remains on the filter, when the secondary glucosides are filtered off. If, instead of in water, the thin liquid extract is dissolved in dilute ammonia, the glucosides of both groups enter into solution, and, on the addition of acetic acid in slight excess, the secondary glucosides are precipitated in large flakes and easily filtered off, while the primary glucosides that had become insoluble are again converted into the soluble kind, and consequently retained by the filtrate. In the cases of cascara and of rhubarb the same conditions prevail. The extract obtained with 70 per cent. alcohol contains water-soluble and insoluble primary glucosides and the undesirable secondary glucosides, which may be separated in exactly the same manner as the secondary glucosides of frangula bark. The two glucosides, frangulic acid and the emodin-forming glucoside, which compose the primary glucosides of cascara and of rhubarb, are separable from each other by the difference in their solubility in 96 per cent. alcohol, which retains the emodine-forming glucoside, but precipitates the frangulic acid. The foregoing observations, which in the original paper enter into the details of character, composition and decomposition of the several glucosides, point out the direction in which pharmaceutical preparations from the drugs named can be improved.—Apoth. Ztg., Aug. 8, 1900, 537–538.

Gentiopicrin—Preparation of the Pure Glucoside.—E. Bourquelot and H. Herissey, who are at present engaged in investigating the properties of gentiopicrin, have obtained the pure glucoside in quantity from fresh gentian by the following process: The fresh sliced root is dropped into boiling alcohol (95 per cent.), cohobated with the menstruum for half an hour; cooled, decanted, and expressed. The solvent is then removed by distillation, the slightly acid residue neutralized with calcium carbonate, allowed to stand for some hours, filtered, evaporated to a syrupy consistence, and set aside, when crystals slowly appear. In about fifteen days crystallization is complete, a semi-solid mass of felted needles surrounded by a treacle-like mother-liquor being obtained. The mass is drained on the filter pump, dried over H_2SO_4, and purified by recrystallization from a menstruum of equal volumes of chloroform and alcohol (95 per cent.) under a layer of ether. This is conducted in a double-bottomed flask, the filtered alcohol chloroform solution being introduced first so that the level of the liquid rises only a few Mm. above the upper diaphragm. Then a layer of ether, equal in volume to the solvent, is cautiously introduced by means of a pipette, without mixing the two liquids. As diffusion takes place, crystals of gentiopicrin form at the line of junction, while amorphous impurities are deposited at the bottom of the flask. The pure glucoside, thus obtained in pale yellow needles, does not directly reduce Fehling's Solution. It is strongly lævogyre, the rotation being $a_D = -196°$.—Pharm. Journ., Sept. 1, 1900, 261; from Compt. rend., *131*, 113.

Ononin—Review of Chemical Characters.—Hlasiwetz some years ago determined the occurrence of a glucoside in the roots of *Ononis spinosa*, which he named "Ononin," and that this is converted on boiling with baryta water into

Onospinin, $C_{29}H_{34}O_{12}$, having a melting point of 162° C., and into formic acid. F. von Hemmelmayr, in reviewing the work of Hlasiwetz, now finds that the formula for onospinin is $C_{28}H_{32}O_{12}$, and that it melts at 172° C. Hlasiwetz has stated that on hydrolysis with dilute acids ononin splits up into ononetin and sugar. Hemmelmayr however states that the reaction is not so simple, a mixture of isomeric decomposition products being formed which are readily transformed one into another. Thus he has crystallized from aqueous solutions, after hydrolysis, needles melting at 122° C., leaflets melting at 158°–160° C., and long flat needles melting at 155°–157° C. All these had the composition $(C_{11}H_{10}O_3)x$. The hydrolysis of onospinin is probably represented by the equation: $C_{28}H_{32}O_2 = C_{22}H_{20}O_6 + C_6H_{12}O_6$.—Pharm. Journ., Mar. 30, 1901, 391; from Berichte, *33*, 3538.

Picrotoxin—New Reaction.—St. Minovici recommends the following method for determining picrotoxin in solutions or in substance. To the substance or to two drops of the solution of the picrotoxin in a glass dish,

previously heated to 80° C., add two drops of sulphuric acid, and after a minute, a drop of a 20 per cent. solution of anisic aldehyde in absolute alcohol. In the presence of picrotoxin a saffron color is developed with the sulphuric acid, which becomes indigo violet on the addition of the anisic-aldehyde solution; this color gradually changes to blue. The reaction is distinguishable with a dilution of 1 : 5000.—Pharm. Centralh., Nov. 29, 1900, 744; from Ztschr. d. Nahr. u. Genussm., 1900, 687.

Strophanthus Glucosides—Chemical Characters, Distinction and Source.—In a comprehensive study of the glucosidal constituents of *Strophanthus Kombé* and *Strophanthus hispidus*, Franz Feist points out that the numerous chemical and physiological investigations recorded since the discovery of strophanthin by Frazer make it evident that the glucosides obtained from the two kinds of seed by identical processes are distinct bodies. Frazer's glucoside is the product of *S. Kombé*, and to it properly belongs the name "strophanthin," while for the glucoside of *S. hispidus*, being quite distinct from this in its chemical composition and reactions, as well as in its physiological action, the author proposes the name "pseudostrophanthin," this latter being probably also a constituent of other kinds of strophanthus seeds. The characters of distinction of the two glucosides are briefly as follows:

Strophanthin: Source, *S. Kombé;* composition $C_{40}H_{66}O_9$; reaction with conc. H_2SO_4, green; melting point, 167°–172.75°; hydrolysis at 70° to 75° with 0.5 per cent. HCl; yield of strophanthidin ($C_{27}H_{38}O_7$) 50–52 per cent.; melting point of strophanthidin, 169°–170.5°; lethal dose when injected subcutaneously per kg. of rabbit, 0.0006 Gm.

Pseudostrophanthin: Source, *S. hispidus* (and probably other varieties); composition ($C_{38}H_{58}O_{15}$ or $C_{40}H_{60}O_{16}$); reaction with conc. H_2SO_4, red; melting point, 179°; hydrolysis at the boiling point with 2.4 per cent. HCl; yield of pseudostrophanthidin ($C_{28}H_{40}O_6$ or $C_{19}H_{28}O_4$) 52.5 per cent.; melting point of pseudostrophanthidin, 1.95°; lethal dose to rabbits per kg. 0.00025–00003 Gm.

Pseudostrophanthin is apparently identical with the strophanthin of Arnaud and of Kohn and Kulisch. It is interesting to note that it has twice the physiological potency of true strophanthin prepared from the high priced *S. Kombé*.—Apoth. Ztg., July 11 and 14, 1900, 469 and 477.

COLORING MATTERS.

Alizarin Green—A New Indicator.—J. Formanek recommends alizarin green as an indicator in certain cases of alkalimetry or acidimetry, since it is equally sharp towards acids and alkalies, giving a carmine red with the former, and bright green with the latter. The tints are readily seen by artificial light. Carbonates should be determined when using this indicator by titrating back, adding an excess of acid, boiling off the CO_2, then retitrating with alkali. Alizarin green is not sensitive to ammonia nor to

salts of alumina.—Pharm. Journ., Dec. 1, 1900, 619; from Zeitsch. für Analyt. Chem., *39*, 99.

Aloin-Red and Guaiac-Blue—Preparation, Characters, Analogy, and Value as Reagents.—Prof. E. Schaer, in a paper read before the Society of German Naturalists and Physicians (Sept., 1900), calls attention to the close analogy existing between aloin-red and guaiac-blue with regard to their formation as products of oxidation and chemical characters—both being produced by the influence of active oxygen, and serving both for the detection of oxidizing agents and for that of oxidizable substances. The substances that serve particularly well for the production of the aloin-red reaction are: Copper salts, in extremely minute quantities, in the presence of cyanogen, sulpho-cyanogen, or ferro-cyanogen compounds; copper salts in the presence of haloid salts of the alkalies; direct oxidizing agents, such as peroxides, permanganates, dichromates, chromic acid, ferric chloride, etc.; and, lastly, substances which have a spontaneous effect due to catalytic action, such as colloidal platinum solutions, and such as are known as ozone carriers, such as hæmoglobin.

Pure Aloin-Red is produced when an aqueous solution of aloin is treated with one or the other of the above-mentioned oxidizing agents. It is obtained in a dry state by precipitating an oxidized methyl- or amyl alcohol solution of aloin by means of ether or benzene. Its aqueous solution has a raspberry-red color; but being much more soluble in alcohol, and particularly in 80 per cent. chloral hydrate solution, such solutions are much darker. It is sparingly soluble or insoluble in ether, benzene, chloroform, petroleum ether, and carbon-disulphide. Its solutions are not affected by acids, but alkalies discharge the color.

Guaiac-Blue, which, as stated, possesses a close analogy to aloin red, is usually prepared by oxidizing an alcoholic solution of guaiaconic acid with ferric chloride. Prof. Schaer obtained it in a pure condition by treating a chloroformic solution of guaiaconic acid with PbO_2, filtering the solution, and adding an excess of ether, which precipitates the guaiac-blue in a pure condition. On drying, a dark blue powder results, which is soluble in alcohol, methyl alcohol, acetone, glacial acetic acid, and chloroform, sparingly in acetic ether, and difficultly in ether, benzene and the homologues of the latter. Acids destroy the blue color of its solution, while in alkaline solution the color is permanent, in these respects just the reverse of aloin-red.—Pharm. Ztg., Sept. 22, 1900, 734–735.

Anthophaein—A Brown Coloring Matter in the Flowers of Vicia Faba.—M. Moebius has separated the coloring matter from the black spots in the corolla of *Vicia faba*, and finds it to be a brown pigment dissolved in the cell-sap, to which he gives the name "anthophaein." It has a strong resemblance, in its physical and optical properties, to the phycophaein of brown sea-weeds, but differs altogether from that pigment in being dis-

solved in the cell-sap instead of being present in the solid state in the chromatophores. Anthrophaein occurs also in the petals of species of *Delphinium*, but does not appear to be a widely distributed substance, the brown color of most flowers being produced by a mixture of chlorophyll and anthrocyan.—Pharm. Journ., Mar. 16, 1901, 324; from Ber. D. Bot. Ges., *18*, 341.

Carotin—Wide Distribution in Plants.—From a series of observations made on a great number of plants, T. Tammes concludes that the pigment of green and etiolated leaves, and of those which turn green in autumn, of fruits and seeds, and of green, blue-green, brown, and red algae, agrees in all its chemical and physical properties with the carotin of the carrot. He states also that in all plants or parts of plants which contain chlorophyll, and which are capable of carbon dioxide assimilation, carotin is invariably associated with chlorophyll, and that it even can induce assimilation by itself.—Pharm. Journ., Sept. 29, 1900, 361; from "Flora," 1900, 205.

Green Coloring Matter of Plants—Investigation.—Tswett divides the yellow and green pigments producing the green coloration of plants into two groups—the "Xanthophylline" and "Chlorophylline" group. The xanthophyllines—carotin, erythrophyll, chrysophyll, etc. — only absorb rays of short period and are not luminescent. The chlorophyllines are fluorescent, and possess, among other things, a characteristic absorption of the red portion of the spectrum. In the present paper he gives an account of his researches made on one of the latter, namely

Chlorophylline Blue. This substance can be prepared by heating the plant with fine sand, and adding eventually magnesia or calcium carbonate to neutralize the cellular juice. The coloring matter is taken out by benzin, and after undergoing various operations to separate it from the other coloring matters, an alcoholic solution of the blue pigment is formed. On slow evaporation this yields it in minute crystals of an inky black appearance.—Chem. News, Dec. 14, 1900, 291; from Compt. rend., Nov. 19, 1900.

Indigo. — Comparative Value of the Madras and Bengal Varieties. — Charles H. LaWall and Robt. C. Pursel have determined the percentage of ash in two samples of *Madras* indigo to be respectively 70.00 and 69.09 per cent., while the ash in a sample of *Bengal* indigo amounted to 8.57 per cent. only, showing the latter to be a far superior product.—Proc. Pa. Pharm. Assoc., 1900, 161.

Indigo—Non-Identity of the Substance Producing It in Different Indigo Plants.—According to M. W. Beijerinck, the substance from which indigo is directly formed is not identical in all indigo plants. In the "indican plants" (*Indigofera* sp, *Polygonum tinctorium*, *Phajus grandiflorus*) the original substance is indican, the glucoside of indoxyl, while in the "indoxyl

plant" (*Isatis tinctoria*) it is indoxyl itself. In all cases the indigo pigment is formed, directly or indirectly, by the oxidation of indoxyl. In the indican plants the indican is found in the colorless protoplasm, while the indican enzyme is located in chloroplasts. The indican is either decomposed by an enzyme, or is split up directly without the intervention of an enzyme through the activity of the protoplasm.—Pharm. Journ., Dec. 22, 1900, 723; from Bot. Zeitung, 1900, 2te Abth., p. 188.

Phykocyanin—A New Coloring Matter from Blue-Green Algæ.—According to R. Kolkwitz, the color of the Cyanophyceæ, which are so abundant in the effluent of sugar works, and are met with both in fresh and salt water, is due to the presence in the plants of a fine indigo blue water-soluble coloring matter, phykocyanin, as well as chlorophyll. It may be obtained in a crystalline state by treatment with ammonium sulphate, in the same manner as albuminoids may be precipitated. The author considers that it is improbable that this body exercises any toxic effect upon fish; the harm caused to them he attributes to the presence of putrid algæ in the water.—Pharm. Journ., Mar. 9, 1901, 289; from Chem. Centralblatt, 72, 50.

Polycystin—A Coloring Matter from Polycystis Flos-Aquæ.—W. Zopf has isolated a crystalline carotin, which he names polycystin, from the alcoholic extract of the alga *Polycystis flos-aquæ*. The extraction with alcohol was effected without heat, and the extract thus obtained saponified with soda solution and shaken out with ether. On evaporating off the solvent, the coloring matter separated as a mass of micro-crystals, showing, when magnified, fine long needles and leaflets with a metallic lustre with reflected light. The spectra of the solutions are different from those of chlorophyll, of carotin, of poppy-red and solanum red. Polycystin does not form compounds with alkalies or alkaline earths. It must, therefore, be classed with the eu-carotins.—Pharm. Journ., April 27, 1901; from Chem. Centralblatt, *72*, 466.

Tecomin—A New Yellow Coloring Matter from Bignonia Tecoma.—T. H. Lee has obtained from the wood of *Bignonia tecoma* a new yellow coloring matter, which he has named *tecomin*. It is a crystalline substance, soluble in alcohol with an orange color, insoluble or very slightly soluble in water; the solution becomes rose-red with alkalies and clear yellow with acids; 2 Cc. $\frac{N}{100}$ alkali or acid causes the color change; it is not affected by any but the strong mineral acids, but the presence of organic acids renders the end reaction indistinct. The wood contains a reddish-brown resin soluble in alcohol from which it is difficult to free the tecomin; also a deep brown coloring matter which dissolves in aqueous alkalies and is precipitated by acids. It is used locally as a dye for cotton and as a stain for wood.—Pharm. Journ., Feb. 2, 1901, 111; from Proc. Chem. Soc., Jan. 17, 1901.

ALBUMINOIDS.

(INCLUDING ANIMAL PRODUCTS.)

Albuminoids—Method of Crystallization.—A. Wroblenski describes the following practical method for obtaining crystals of albuminoids. The solution to be crystallized is confined in a tube with a parchment bottom. Evaporation takes place through the parchment, although the surface exposed shows no signs of moisture from transpiration of the liquid. The method has enabled the author to obtain crystals of albuminous substances of greater purity, and freer from the crusts which form on their surface, than those resulting from the use of Hoffmeister's method.—Pharm. Jour., Jan. 12, 1901, 27; from Bull. Cracow Academy, through "Nature."

Albumen—Coagulability by Creosote and by Carbolic Acid.—Which see,

Albuminoids—Formaldehyde a Distinctive Test.—According to G. Guérin ovalbumin, although it gives no precipitate with formaldehyde and its mixture with it is not coagulated on heating, retains indefinitely its property of precipitating with nitric acid. Serum-globulins, on the contrary, are almost insoluble in formaldehyde, strong solutions of them giving with that reagent a gelatinous coagulum, and more dilute solutions a flocculent or pulverulent precipitate. If 15 or 20 per cent. of formaldehyde be added to solutions of serins, no precipitate is formed, and those bodies are, after a time, neither coagulated by heat nor by nitric acid in the cold.—Pharm. Journ., Dec. 29, 1900, 753; from Journ. de Pharm. Chim. (6) *12*, 465.

Milk—Estimation of Fat.—Lindet recommends a method of estimating the fat content in milk (and cheese) which is based on the solubility of casein in a concentrated solution of resorcin. The apparatus designed for effecting this analysis consists of a cylindrical glass bulb, having a capacity of 15 Gms. for milk analysis, and 18 to 20 Gms. for cheese; it is closed at one end with an india-rubber stopper, through which a glass rod passes; the other end terminates with a narrow graduated tube, the special calibration and use of which is fully described. When in use this apparatus is placed vertically with the graduated tube downwards; this tube is plugged and filled with mercury to prevent the casein entering and making it dirty. Five Gm. of resorcin, 5 Cc. of milk, 2 drops of soda at 36°, and 1 drop of solution of a coloring material are introduced; the stopper is then fixed in firmly, and the whole apparatus turned upside down to allow the mercury to fall out of the graduated end, which is then unplugged; it is then placed in a water-bath of sufficient depth for the graduated tube to be almost entirely immersed in the boiling water. The casein dissolves rapidly, especially if the apparatus is shaken, which must be done with care. It is left in the water-bath until the level of the butyrous layer does not alter after two readings made at an interval of ten minutes. The operation lasts half-an-hour. The results obtained are

identical with those given by exhausting with ether. The estimation of the fatty matter in cheese is even more simple, and the separation of the two layers is done more easily. One Gm. of cheese, about 15 Cc. of a warm solution of 100 Gm. of resorcin in 100 Cc. of water are placed in the apparatus, which is then reversed and treated as before. The operation lasts from ten to fifteen minutes. If it is desired to estimate the fatty matters in cream, it is only necessary to dilute the cream with the quantity of water necessary to bring it to the original strength of the milk.—Chem. News, Sept. 28, 1900, 159; from Bull. Soc. Chim. (3), xxiii., No. 10.

Milk—Gravimetric Determination of Fat.—Octave LeComte suggests for the gravimetric determination of milk-fat the use of anhydrous sodium sulphate in order to obtain an evenly distributed dry milk residue for extraction with ether. He places 20 Gm. of the anhydrous Na_2SO_4 in a mortar, finely powders it and then pours upon it 10 Cc. of the milk to be examined. The mixture is triturated to obtain a homogeneous mass, then exposed to the air on a watch glass for an hour. The compact mass thus obtained is powdered, packed in a small extractor and exhausted with ether; in the ethereal extract the fat is determined by weighing after evaporating the solvent, in the usual manner.—Pharm. Journ., Febr. 9, 1901, 135; from Journ. Pharm. Chim. [6], *13*, 58.

Milk—Detection of Formaldehyde.—Herman Harms describes the most important tests that are available to determine the presence of formaldehyde in milk with certainty. He singles out the "*Rimini Test*" as highly recommendable. This test consists in adding to 15 Cc. of the suspected milk 10 drops of aqueous solution of phenyl-hydrazine muriate (1 : 200) and 3 drops of aqueous solution of sodium nitroprusside (1 : 60), mixing well, and allowing 5 drops of solution of soda (15 : 60) to run *slowly* on the side of the test-tube, when, in the presence of formaldehyde, a *blue* color is *instantly* produced, changing on standing to red. If the milk is sour a *green* instead of a blue color is produced initially. The test is available in the presence of one part of formaldehyde in 25,000 or 30,000 parts of milk. Hehner's test, the phloroglucin test, and Liebermann's phenol test are also quite reliable. The "*Hehner Test*" consists in mixing 1 or 2 drops of ferric chloride test solution with 15 Cc. of concentrated sulphuric acid and carefully superimposing a layer of the suspected milk. A *violet color* develops, sometimes at once, oftener not for five or ten minutes, and sometimes not for an hour or so, this depending on the amount of formaldehyde present. The test is available for 1 part formaldehyde in 10,000 or 15,000 parts of milk. The "phloroglucin test" consists in adding to 10 Cc. of the suspected milk, 5 Cc. of solution of phloroglucin (1 : 100), shaking, and adding 1 Cc. of solution of potassa U. S. P., when, in presence of formaldehyde, a *red* color is developed at once, but usually fading within 5 or 10 minutes. One part of formaldehyde in 20,000 gives

a decided reaction. The "*Liebermann's Phenol Test*" appears to be the most delicate of all, but is more circumstantial. A few cubic centimeters are distilled off from the milk, one drop of very dilute aqueous phenol solution is added to the distillate, and this is carefully poured upon concentrated sulphuric acid, in a test-tube, so as to form a layer. A bright *crimson* color appears at the zone of contact. This is easily seen in as little as one part in 200,000, and in greater proportion in one to 100,000. There is a milky zone above the red color, and, if more concentrated, there will be a whitish or pinkish precipitate. Sometimes the zone will appear in about an hour, one-tenth of an inch below the line of contact. The simplest test is the "*Hydrochloric Acid Test*," but it cannot be depended on. This consists in boiling 15 or 20 Cc. of the suspected milk with 2 or 3 Cc. of strong hydrochloric acid a few minutes, when a *red* color indicates the presence of formaldehyde. When testing cream by any of these tests it should be diluted with an equal volume of water.—Bull. Pharm., Aug., 1900, 316.

Milk—New and Delicate Test for the Presence of Formaldehyde.—On the basis of the observation that phenylhydrazine hydrochloride and caustic soda solution give a pink to red color with aldehyde in dilute solutions, Riegler proposes a very delicate test for the detection of formaldehyde in milk, which is applied as follows: In a test-tube mix 2 Cc. of the milk, 2 Cc. water, and about 0.1 Gm. white crystallized phenylhydrazine hydrochloride; shake until the latter is completely dissolved and then add 10 Cc. of a 10 per cent. solution of caustic soda; shake for half a minute. If there is a large proportion of formaldehyde present a beautiful pink color develops during the shaking, whereas if the proportion is small, several minutes elapse before the color appears. Normal milk gives no color in the cold even after standing for two hours. In applying this test about 0.1 Gm. of sodium acetate is first added to 1 Cc. of milk, from 2 to 3 Cc. of water and about 0.1 Gm. of phenylhydrazine hydrochloride, the mixture heated to boiling, and then 10 Cc. of soda solution added. The mixture is well shaken, and soon develops a rose tint passing to red.—Pharm. Centralh., Dec. 13, 1900, 770.

Milk—Vitality of Micro-Organisms.—F. Valagussa and C. Ortona have investigated the action of sunlight on bacteria in milk, and found that the opacity of the liquid prevented deleterious effect, except in the case of those varieties which live on the surface of liquids, and were, therefore, not shielded from the bactericidal action of sunshine. It was also found that although the diphtheria bacillus produces toxin when growing in milk, its strength is less than when grown in other culture-media; moreover, a marked increase in the strength of the toxin was noted when the cultivations were kept in a cool cellar instead of at the ordinary temperature of the laboratory. The exact thermal death-point of the tubercle bacillus in milk was also reinvestigated, this being a matter on which many different

opinions are held. The authors state that exposure to a temperature of 60°, 70° and 80° C. is insufficient to guarantee the destruction of this bacillus in milk. Milk freshly drawn from the cow, with precautions ensuring its sterility, was found to afford a better culture material for bacteria than after it had been artificially sterilized by heating to 100° C. —Pharm. Journ., April 6, 1901, 424; from Annali d' Igiene Sperimentale.

Aluminum Caseinate — A New Astringent Remedy. — Aluminum caseinate, which has recently been recommended as an astringent remedy, in daily doses of 0.25 to 0.3 Gm., is described as a yellowish white powder, insoluble in water, but becoming slightly soluble in the saliva. It contains 5 per cent. of the metal. — Pharm. Journ., May 25, 1901, 665; from E. Merck's Ann. Rep. for 1900.

Blood — Iodine a Constant Constituent. — The experiments of E. Gleg and P. Bourcet seem to prove that iodine is a constant constituent of normal blood, in which it occurs in combination with the albuminoids of the serum. The amount present varies greatly, the highest figures obtained being 0.112 Mgm., the lowest 0.013 Mgm. per liter. No iodine was detected in the solid constituents of the blood, and none also in that portion of the serum which dialyzes; it was only found in the colloidal portion of the plasma after the crystalloids had been removed by dialysis.— Pharm. Journ., Aug. 4, 1900, 161; from Comptes rend., *130*, 1721.

Serum Globulins—Antitoxic Value. — J. J. Atkinson has carried out a number of experiments upon the fractional precipitation of the globulins of normal horse serum and of diphtheria antitoxic serum with magnesium sulphate, and has investigated the antitoxic strength of the precipitates. The following are his conclusions: (1) The globulins of both normal and diphtheria-antitoxic sera exhibit chemically towards reagents the same reaction, being precipitated by magnesium sulphate, and split up into fractions in precisely the same way. (2) All the diphtheric-antitoxic power of both normal and immunized serum is always carried by the globulin and its fractional precipitates. (3) During the fractional precipitation of the serum globulin of horses immunized from diphtheria toxin, and of horses not immunized from diphtheria toxin, some of the globulin is lost, likewise at the same time some of the antitoxic power of the globulin of the immunized serum is lost. (4) These reactions strongly incline us to consider "diphtheria antitoxin" a form of globulin. (5) The reactions of globulin, previously separated from the serum by magnesium sulphate, with sodium chloride lead one to think that there is a formation of globulin salts. (6) Since serum albumin in a magnesium sulphate solution gives fractional precipitates at definite temperatures, it seems not improbable that the albumin is precipitated in the form of albumin salts. — Pharm. Journ., Nov. 17, 1900, 557; from Journ. Exp. Med. *5*, 67.

Yeast-Invertin—Chemical Relations.—E. Salkowski in reporting upon

the invertin of yeast states that he has found such invertin, prepared by Barth under his supervision, as well as some prepared by himself, to be contaminated with gum. The invertin prepared by Osborne and Koelle, who used the same method as the author, may also be taken to contain gum, and he agrees with Osborne and Barth that invertin is not an albuminoid. On the other hand, one cannot conclude from the formation of mannose with acids that invertin is of a carbohydrate nature, and Salkowski infers that the carbohydrate obtained from invertin by Wrobewski was also mannose, though the latter holds the opinion that invertin is an albuminoid. — Pharm. Journ., April 20, 1901, 486; from Berichte, through Chem. Centralbl., *72*, 263.

Zymase—A Yeast Enzyme Producing Fermentation of Saccharine Solutions.—In continuation of previous investigations (see Proceedings, 1899, 771 and 772), E. Buchner gives the results of experiments which confirm him in the view that the active agent in fermentation processes is of enzymic character. Yeast was dried *in vacuo* at temperatures from 35°–100° C., and heated for several hours in a current of hydrogen, first at 100° and then at 110° C. After this treatment the yeast has no fermenting power, as was conclusively proven by observation of its action on wort. The sterile yeast was then ground up into a paste with sand, kieselguhr and 10 per cent. aqueous solution of glycerin, and the mass subjected to strong hydraulic pressure. The liquid pressed out from the paste was found to have strong fermenting action. In spite of the sterilization and the loss involved in the extraction with aqueous glycerin, the fermenting power was found to be one-quarter to one-half that of the original yeast. These experiments do not conform to the hypothesis set up by the opponents of the enzyme theory that the fermenting power of press yeast is due to living protoplasm, for the latter is certainly no longer present in the yeast after its subjection to the sterilizing process described. The specification of the enzyme, zymase, is, therefore, not dependent on the presence of the living cell.—Pharm. Journ., Jan. 12, 1901, 27; from Berichte, *33*, 3307.

Zymase—Preparation and Characters of the Yeast-Cell Plasma Supposed to Contain it.—A. Macfadyen, G. H. Morris and S. Rowland have prepared and examined the expressed yeast-cell plasma from which Buchner claimed to have isolated the active alcohol ferment, or zymase, the action of which on fermentable sugars he believed to have demonstrated (see also above). In the experiments of the authors named, the reagent was purified from fermented wort by suspending in water and centrifugalizing, then subjected to a pressure of about 100 atmospheres, and disintegrated by attrition with sand. The intracellular juices were separated by absorption with kieselguhr and subsequent expression. So treated 100 Gm. purified yeast yield 30.35 Cc. expressed juice, which produced carbon dioxide, and alcohol standing alone or with sugar. The fermentative

activity is stopped by freezing or by dilution with water or physiological salt solution, but increases with age up to the third or fourth day from collection. The quality of sugar that disappears under the action of the juice exceeds what can be accounted by the production of carbon dioxide and alcohol. This points not to an enzyme explanation of the process, but to a theory referring the phenomenon to the vital activity of the yeast-cell protoplasm, such as goes on in the ordinary vegetable cell. This theory explains the auto-fermentation of the juice as the decomposition of the complex compound of sugar with the protoplasmic constituent of the cell. Pharm. Journ., Jan. 5, 1901, 2 ; from Proc. Roy. Soc., *67*, 250.

Proteolytic Enzyme—Occurrence of an Analogue to Animal Trypsin in all Germinating Seeds.—M. V. Harlay finds the proteolytic enzyme of germinating lentils to be analogous in the substances resulting from digestion, to animal trypsin, and probably identical with that which is found in germinating barley. Similar results were obtained with germinating seeds of *Ceratonia siliqua*, and the author regards it as probably a general law that a ferment analogous to trypsin, and producing tyrosin as one of the products of its digestion, is present in all germinating seeds. This is probably also the case with rapidly growing plants like fungi ; while in adult phanerogams, where there is no rapid growth, the ferment is one analogous to animal pepsin, giving rise on digestion to a chromogen which becomes green.—Pharm. Journ., Dec. 15, 1900, 689 ; from Compt. rend., *131*, 523.

Proteolytic Enzymes—Presence in Lupines.—The occurrence of an enzyme in the germs of lupines, observed by Green in 1887, was disputed by Neumeister in 1894, who in turn demonstrated that the peptonization of the albuminoids in the germs of wheat, barley, maize, poppy and turnip seeds was due to the presence of an enzyme. H. Butkenitsch has now made a series of careful experiments with the germinated seeds of *Lupinus angustifolius*. These were dried at 35°–40°, at which temperature the enzyme is not destroyed ; then powdered, and the powder extracted with ether in order to exclude the possible action of protoplasm. Then, after the addition of thymol water to exclude the action of micro organisms, the seeds were exposed in a flask to a suitable temperature in a thermostat for a certain time, and afterwards subjected to analysis. The results showed conclusively that the decomposition of the albumen was uniformly accompanied by the formation of amides. So, for instance, the percentage of albuminoids had fallen after 8 days from 6.35 per cent. to 4.99 per cent., but the nitrogen of the amide compound had increased from 0.42 per cent. to 1.66 per cent. If, on the other hand, the contents of the flasks were first heated to boiling, whereby the enzyme would be destroyed, no such changes could be observed. The observation of Green that lupines contain a proteolytic enzyme is therefore confirmed. The author has made similar experiments with the seeds of *Ricinus communis* and

Vicia faba with identical results.—Apoth. Ztg., July 28, 1900, 513; from Ber. d. d. Bot.-Ges., 1900, 185.

Fungus Enzymes—Classification and Distribution.—P. Kohnstamm has studied the enzymes produced by fungi, selecting for this purpose *Agaricus melleus*, *Merulius lacrymans*, and *Polyporus squamosus*. These enzymes may be classified into four kinds, those which attack starch, glucosides, proteids, and cullulose respectively. The author obtained from all three species named, a starch-destroying enzyme (amylase) apparently identical with the diastase of malt. A glucose-destroying ferment (emulsin) was found in the second and third, but not in the first; a proteolytic ferment somewhat feebly in all three. A cellulose-decomposing enzyme (cytase, cellulase) was detected with certainty only in *Merulius lacrymans*. In *Polyporus squamosus* the fermenting sap is produced only by the receptacle; in *Merulius lacrymans* the mycele has also this property. The action of emulsin is seen especially in the destruction of the coniferin in conifers, and in the action of *Polyporus squamosus* on the æsculin of the horse-chestnut. It is the hadromal that possesses the property of setting free the cellulose, and thus exposing it to the action of a cytase.—Pharm. Journ., May 11, 1901, 589; from Beihefte z. Bot. Centralbl., 1901, p. 90.

Tannase — A Zymase from Moulds.—A. Fernbach and Henri Pottevin, working independently, have found that the moulds *Aspergillus niger* and *Penicillium glaucum*, when cultivated in a modified Raulin's solution, in which tannin is substituted for sugar as the nutrient agent, yield a zymase which converts tannin into gallic acid. The same mould grown on normal Raulin's solution containing sugar has no such action. The first-named author notes that there is always present in the interior of Chinese galls a little woolly tuft, which when sown on Raulin's solution gives an abundant growth of *Aspergillus*. Tannase is precipitated by alcohol; it is most active in neutral solutions, and at a temperatuae about 60° C. It attacks the so-called tannates, particularly the tannin gelatin compound. It appears to be widely distributed in tannin-bearing plants, Pottevin has isolated it from the leaves of the sumach.—Pharm. Journ., Jan. 12, 1901, 28; from Comptes rend., *131*, 1,214 and 1,215.

Invertin—A New Enzyme in Grapes.—M. V. Maitland has determined the presence in the juice of all kinds of grape of a sucrase, *invertin*, in quantities sufficient to invert the whole of the saccharose present, without the assistance of any organic acid. It is not present in wines attacked by bacterial diseases, and disappears entirely in wines which have been strongly oxidized.—Pharm. Journ., Jan. 19, 1901, 53; from Comptes rendus, *131*, 108.

Catalase — A New Oxidizing Enzyme in Tobacco. — O. Loew finds in fresh tobacco leaves a new enzyme which possesses the property of decomposing hydrogen peroxide. He has named this substance *catalase*,

and believes it to be very widely distributed in both plants and animals. It occurs in both a soluble and an insoluble form; in its soluble or albumose form it frequently combines with a nucleo-proteid. That catalase belongs to the oxidizing ferments is shown by its power of oxidizing hydrochroquinone into quinone.—Pharm. Journ., Jan. 19, 1900, 53; from U. S. Department of Agriculture, Bull. No. 3, 1900.

Lotase.—A New Enzyme in the Leaves of Lotus Arabicus, which see, under "Materia Medica."

Papain—Effect of Heat.—According to the investigations of V. Harlay, the digestive power of papain is not affected by dry heat; that is, three hours at 100° over sulphuric acid. The action of heat on papain in solution is very different, however; a temperature of 82°, under the conditions of experiment described, causing its destruction. At temperatures below 75°, the disaggregation of fibrin was complete in twenty-four hours, but at 81.5° the fragments of fibrin were only softened superficially, and at 82° the papain had no effect whatever, even after twenty-four hours.—Chem. News, Aug. 10, 1900, 71; from Journ. Pharm. Chim. (6), xi., No. 6.

Pepsin—Improvement of the Test of the Codex.—P. Macquaire suggests some improvements on the official test of the codex for the assay of pepsin, in which digestion is directed to be performed on fresh, washed fibrin, pressed free from water by hand. He points out that the amount of adherent water left by two different operators varies widely, thus introducing a large factor for error in the assay. By experiment he finds that fibrin dried at 40° C. is as digestible as the fresh substance, that it keeps well, and that twenty-five parts are equivalent to one hundred parts of moist, hand-pressed fibrin. The results with the dried fibrin are not alone more concordant or definite than with the official form under like conditions, but the peptone solutions from it are more easily filtered.—Pharm. Journ., August 4, 1900, 161; from Journ. de Pharm (6), *12*, 67.

Pepsin—Valuation by Time-Limit.—J. B. Nagelvoort suggests a method for estimating the proteolytic value of pepsin which depends on the quantity required to dissolve a known quantity of egg-albumen in a specified time. Having determined, for instance, that 1 part of pepsin will dissolve 3000 parts of egg-white under given conditions and in suitable media in a specified time, the greater or less quantity of a sample under examination required to effect solution during the same time will practically point out its relative proteolytic value. Thus, if only ¾ part of pepsin are required, the strength would indicate 1 : 4000, while if 2 parts are required the indicated value of the sample would be 1 : 1500, etc., etc. To carry out the experiment he employs a solution of 5 Cc. of hydrochloric acid in 1000 Cc. of distilled water, and he dissolves 0.1 Gm. of the sample in 100 Cc. of this acidulated water. This solution, previously heated to 38° C., is

then added in quantities of 1, 2, 3, 4, 10 Cc. to previously prepared mixtures of 10 Gm. egg-albumen and the same acid solution contained in as many Nessler's reagent glasses and maintained at a temperature of 38° C. in a water-bath. The egg-albumen is obtained by boiling fresh hen's eggs for fifteen minutes, counting from the time the water begins to boil, and then pulping the coagulum, carefully freed from egg-yolk, by passing it through a copper-wire sieve. Each Nessler's cylinder is furthermore provided with a glass rod, bearing at its lower end two circular discs of rubber, a short distance apart, to serve as a churner, so that the contents of the cylinder may be stirred and agitated during the digestion. The temperature being carefully maintained for the specified time, it is easy to determine whether the sample corresponds in strength to the sample accepted as normal, or what relation it bears to it, the end of the reaction being indicated by the complete solution of the albumen, and consequent classification of the liquid. For the purposes of control, a normal sample is tested at the same time under identical conditions.—Apoth.-Ztg., July 18, 1900, 485; from Pharm. Weekbl., No. 4, 1900.

Pepsin—Necessity of Testing.—G. and H. Frerichs have examined pepsin from fourteen different German manufacturers—represented in forty samples—with results which point out the importance of pepsin-testing by pharmacists. Only four of the samples responded in every respect to the requirements of the Germ Pharm., while thirteen others did so fairly only, leaving small quantities of albumen undissolved. The remaining samples were quite unsatisfactory, in many instances leaving very large quantities of albumen undissolved under the condition of the test. Moreover, there was no uniformity of quality in the samples of the same manufacturer, thus emphasizing the importance of testing each fresh consignment of pepsin rather than to depend on the claims or reputation of the maker. The method of testing directed by the Germ. Pharm. is shown by the authors' experiments to be fair and reliable, but must be carried out under certain precautions. It is important that the prescribed temperature (45° C.) be maintained throughout the specified period of digestion (one hour) and that this period be strictly adhered to. The one point of uncertainty is to determine when solution is complete "with the exception of a few white-yellowish particles of membrane," this being liable to different interpretation or recognition. The presence of these membranous particles is unavoidable, and manifests itself just as well in the presence of an excess of pepsin as when there is just enough to effect solution, and in this the authors find the remedy. The official test requires that 0.1 Gm. pepsin shall dissolve 10 Gm. egg-albumen under the conditions of the test. By making a parallel test, using about five times as much pepsin (0.5 Gm.), the appearance of the resultant solutions should be the same if the sample is of official quality. Furthermore, the authors observe that it is not a matter of indifference whether the albumen of hen's egg or duck's egg is

used. They find that the coagulated albumen of a duck's egg is dissolved by the pepsin with far greater difficulty than that of hen's eggs.—Apoth. Ztg., July 28, 1900, 512.

Pepsin—Questionable Value as a Digestive Agent.—Joseph R. Perry, M. D., communicates the results of experiments made with different preparations of pepsin of the market, as well as with pepsin prepared by himself from fresh hogs' stomachs, which lead him to express the remarkable opinion that "*pepsin by itself has no digestive power at all.* Pepsin alone, put into the stomach, only adds to the labor of that organ." He regards hydrochloric acid as the real digestive agent. Following the directions of the Pharmacopœia, for instance, for testing pepsin, he found that it worked just as the Pharmacopœia intimates it will. Then, in leaving out the pepsin and using only the solution of hydrochloric acid, he found the albumen was dissolved in about the same time. On the other hand, when pepsin alone was used and the hydrochloric acid omitted, the albumen remained unchanged during the period directed, and was not changed after ten days.—Western Drugg., 1900, 135; from Eclectic Med. Journ.

Benjamin F. Fairchild, in a dispassionate criticism of the above paper, says that it is simply incredible that any one making the experiments described by Dr. Perry could possibly find that diluted hydrochloric acid, under the conditions of the U. S. P. test, by itself, converts egg-albumen into solution. The pharmacopœial method for the "valuation of pepsin" provides a certain medium suitable for the action of pepsin—a medium approximating in chemical constitution to pure gastric juice, and the conditions of the test otherwise approximate to those of bodily digestion. Under these conditions, a given amount of pepsin is required to digest a definite amount of albumen. The pharmacopœial solution without pepsin is absolutely incapable of converting coagulated egg-albumen into solution. On the other hand it is a well-established fact, known to all experimenters, that pepsin is active only in the presence of acids, that in neutral solution it is inactive, and that in alkaline solution, being destroyed, it becomes permanently inactive. But even when administered without acid, or in feeble acid, pepsin is esteemed a valuable therapeutic agent by a host of physicians and by eminent specialists in the treatment of disorders of digestion. Dr. Perry's sweeping dictum that "pepsin is one of the greatest humbugs in the whole list of the armamentarium of the physician," is therefore not justified.—West. Drugg., Sept., 1900, 471–473.

Pepsin, B. P.—Solubility in Alcohol.—F. C. J. Bird finds that the bulk of the B. P. pepsin met with in commerce, although agreeing with the official requirement in point of protleoytic power, does not possess anything like the degree of solubility "in about 100 parts of 90 per cent. alcohol" indicated in the Pharmacopœia. The following table shows the results obtained with representative specimens of pepsin as indicated:

Physical Appearance.	Strength.	Per cent. of one part dissolved by 100 vols. 90 per cent. alcohol.
1. Transparent scale.	Full B. P.	37
2. Yellowish powder.	B. P.	17
3. Nearly white powder.	Much above B. P. in strength.	29

The author has never met with a sample of pepsin which would answer to the B. P. description of solubility in alcohol.—Trans. Brit. Pharm. Conf., 1900, 432.

Gastric Juice—Presence of Free Hydrochloric Acid and Value of Günzberg's Test.—The statement of Thos. Maben that the presence of free hydrochloric acid in the stomach interferes with the test for lactic acid proposed by him (see under lactic acid), leads the editor of the Druggist Circular (Nov., 1900, 218), to call attention to Dr. Richard B. Faulkner's article contributed to the Journal of the Amer. Med. Society in 1895, in which he held that free hydrochloric acid was never present in the stomach, the reactions supposed to show its presence being fallacious, and consequently the tests for it—among them that of Günzberg—were entirely worthless as aids in diagnosis. Dr. Faulkner maintains that the identical rose-red tint will be obtained when no free mineral acid is present, and that it is produced with equal facility in the presence of oxalic acid formed by the oxalic diathesis, or introduced as potassium binoxalate in food, and by tartaric acid introduced in the same way. The challenge of the editor referred to that some one should take up the defense of the hydrochloric acid theory in rebuttal of the attack made on it by Dr. Faulkner, has now been accepted by Joseph L. Mayer, who communicates the results of his investigations in an interesting article in which he covers the salient points in controversy very completely. It suffices to state here that a sample of gastric juice which gave a very decided reaction with Günzberg's reagent, failed to give the reaction after it had been neutralized with potassium hydrate and mixed with the substances claimed by Dr. Faulkner to give the reaction under the same conditions. The additions made to the neutralized gastric juice were in the different experiments the following: (1) Potassium binoxalate and lactic acid; (2) potassium binoxalate and tartaric acid; (3) potassium binoxalate alone; (4) tartaric acid alone. Chloride of sodium was present in each case. In every case, on evaporating a few drops of the mixture with an equal quantity of Günzberg's reagent to dryness, the test failed to respond. These results clearly demonstrate that Dr. Faulkner's experiments and conclusions have led him to adopt a hypothesis which is

not sustained by the facts. Mr. Mayer's paper is concluded by a list of references consulted in the course of his researches.—Drugg. Circ., May, 1901, 92–94.

Mucus — Toxity when Injected into the Circulation. — Charrin and Moussu observe that, although mucus is one of the most largely formed and widely distributed of animal secretions, yet when injected directly into the circulation it has a very marked toxic action. For rabbits a dose 0.05 to 0.15 Gm. per kilo body weight caused death in one or two minutes. It acts by causing the coagulation of the blood. That this is so is shown, not only by *post-mortem* observation, but by the fact that animals which have received an injection of extract of leeches, which prevents coagulation, are rendered immune to the toxic effects of mucus injection. The nature of the coagulating principle is not yet determined; it is not a fibrin ferment, since in alkaline dilutions it withstands for several minutes exposure to a temperature of 100° C. It does not dialyze, or at the most only partially, and is precipitated by ammonium sulphate. —Pharm. Journ., Feb. 9, 1901, 135; from Comptes rend., 132, 164.

Animal Extracts—Therapeutic Uses.—"E. Merck's Annual Report," for 1900, gives the following information concerning the therapeutic uses and value of various animal extracts and derivatives:

Gasterine, the natural gastric juice of the dog, has been suggested in the treatment of so-called hypopepsia, where the active constituents of the gastric juice are absent or deficient. It contains much pepsin and rennet ferment, together with about 5.6 per cent. of hydrochloric acid, and is said to possess considerably greater digestive power than ordinary pepsin preparations.

Hypophysis or Pituitary Gland.—This organ, or the infundibulary portion, contains one substance which increases the blood-pressure and another which lowers it. Both are soluble in salt solution, but the first is insoluble in alcohol or ether, whereas the second is soluble in those liquids.

Iodothyrine is believed to be less valuable as a remedy than the entire glandular substance of the thyroid, as the arsenical nucleins of the gland are now supposed to have a share in its functions.

Mammary Gland Extract has been reported on favorably as a remedy for metrorrhagia, and uterine fibroids. For many cases it should be combined with thyroid extract.

Medullary Extract and the medulla itself give rise to digestive leucocytosis, and tend to improve the nutritive condition of young animals, in cases of anæmia, etc.

Ovarian Extract has been injected subcutaneously in doses of 3 to 5 Cc. for neurasthenia in women. The administration of the ovarian substance appears to produce no ill effects, and compressed tablets can now

be obtained, each containing 0.07 Gm., of the dried substance, that quantity being the equivalent of 0.5 Gm. of the fresh ovarian substance.

Renal Substance is of doubtful value as a remedy. It is administered in doses of 0.25 to 1.0 Gm., up to 8.0 Gm. per day, that quantity being equivalent to 40.0 Gm. of the fresh renal tissue.

Splenic Extract has been administered with the object of developing leucocytosis in cases of typhoid, malaria, influenza, and tuberculosis. Doses of 0.3 Gm. are given at intervals of 2 to 3 hours during 24 hours, so long as the body temperature remains at 40° C.; when the temperature falls to 39° C. the daily dose of extract is reduced to 3 Gm.

Thyroid Gland powder continues in steady use. The fresh normal thyroid gland in man and domestic animals has been shown to contain 0.85 Mgm. of arsenic per 100 Gm., in addition to iodine.—Pharm. Journ., June 15 and 22, 1901, 755, 778 and 779.

Thyroids — Variability of Iodine Content. — From experiments made upon the thyroid glands of French and North African sheep, P. Luiffet confirms the results of Baumann on German sheep, that the iodine content of the glands varies in animals fed in different localities. He finds that the thyroids of sheep fed on salt marshes are markedly richer in iodine than those grazed on pastures not abnormally saline. Those from the former yielded from 0.121 to 0.140 per cent. of iodine, while from the latter only from 0.0735 to 0.88 per cent. was obtained. This difference appears to be essentially due to the food. Sheep fed on salt marshes graze on such plants as *Salicornia*, *Salsoda soda* and *Atriplex portulacoides*, which are probably rich in iodine. The author has not found the amount of arsenic contained in thyroids of different origin to vary in the same degree as is the case with iodine. — Pharm. Journ., Oct. 20, 1900, 440; from Journ. de Pharm. [6], *12*, 52.

Thyroids—Precaution in Selection, Manipulation, etc.—"Galen" observes that "Liquor Thyroidis" (B. P., 1898) should undoubtedly be prepared by the dispenser as required, and suggests certain precautions concerning the selection and manipulation of the gland for this purpose. The gland should be procured on the day when the animal is slaughtered, the butcher being cautioned not to injure it with the knife. It should be removed with some of the surrounding tissue, and no attempt to remove this need be made until the glands are in the pharmacy. When the glands are required the apprentice may be sent for it with a wide-mouthed bottle, which has been previously boiled, filled with 0.5 per cent. solution of carbolic acid, and the mouth plugged with cotton wool which has been scorched in a Bunsen flame; on the removal of the glands from the sheep they should be quickly transferred to the bottle and conveyed home. Many of the glands may be rejected at once on account of their abnormal size, but those which contain cysts are not so easy to detect. Sometimes

the cyst can be seen before cutting the gland, but not often. Do not carefully remove every particle of fat and other tissue before cutting the gland, or much time will be wasted on account of the large number of glands which have to be rejected after having been carefully trimmed because they contain cysts. Roughly trim off the greater part of the tissue and slice the lobe longitudinally with the knife, when any cyst will be at once detected. It is impossible to give any figure as to the average percentage of glands which are useless, sometimes as many as fifty per cent. will contain cysts. The pale yellow substance contained in the cyst is not pus but a fatty substance, so no repugnance need be felt by the manipulator on that score. When the glands have been freed from adherent tissue they should be sliced on the board and pounded in a mortar. This is a laborious task, as the glands are not ordered to be triturated with any dividing substance such as glass or sand, as with pancreas, and it is questionable whether such a course is desirable; the liquor not being finally filtered, there is the liabiiity of some of the finer portions of glass finding their way into the finished product. If much of the liquor be made at one time, labor may be saved by mincing the glands with one of the patent mincing machines at present on the market. If the Pharmacopœia directions be carefully followed, a very presentable preparation will result.—Pharm. Jour., June 8, 1901, 718.

Suprarenal Capsule—Therapeutic Properties.—Dr. W. H. Bates discusses the therapeutic properties of the suprarenal extract in the light of his own chemical observations, his laboratory experiments, and the experience of physicians whose work lies in other fields. The curative action of this substance, dealing with all inflammations of the body and with those diseases which are affected by changes in blood-pressure, covers a wide area of therapeutic application. If we are to use this drug, which is so rapid that its maximum effect is reached in less than one minute, and so potent that some obstinate cases of chronic keratitis have been cured in one treatment, it is imperative that we should know what effect the suprarenal extract, absorbed from its local use in the eye or ear, will have on other organs, since the patient may also have serious lesions of the heart, kidneys or other tissue. The conclusions drawn by the author from the data ascertained as mentioned, point out that no condition of organic disease contraindicates the use of suprarenal, nonseptic solutions being absolutely harmless. Its constitutional action may be briefly described as a muscle tonic, restoring the power of contractility to all muscle fibers, especially those of the arteries and heart. The fact that the suprarenal is a muscle tonic, supplying what is one of the necessary components of muscle tissue, may also explain why it is not a poison. In dealing with a drug a small dose of which produces a powerful effect, we naturally expect a large dose to be an active poison, but the suprarenal is unique in that while one-tenth grain has produced the maximum physiologic effect, two

ounces caused no further effect. It has been shown by physiologic experiments that the excess of the suprarenal supplied for muscle tissue is stored for future use. It is important also to remember that no result will follow the administration of it unless its use is indicated, and when indicated the benefit follows immediately. For general use a

Solution of Suprarenal Capsule is eminently and efficiently prepared as follows: Taking one part of the dried powdered suprarenal to ten parts of a saturated solution of boric acid, it should be held in a test-tube over a flame until it boils; then it should be filtered and the filtrate boiled in its permanent receptacle. A solution so prepared will retain its properties unimpaired for months, particularly if boiled daily to prevent decomposition. But the author observes that a more active solution is obtained when it is prepared without boric acid, that the best local effects are obtained when freshly prepared solutions are used, and that it takes only about three minutes to prepare a solution as described. It would seem best, therefore, to prepare the solution as required and omitting the boric acid.—West. Drugg., Oct., 1900, 544–545.

Suprarenal Extract—Therapy.—Bates states that suprarenal extract acts as a local astringent, vascular constrictor and powerful cardiac stimulant. Applied locally to the nose and throat, it reduces congestion, and is of special benefit in rhinitis and hay fever. In eye diseases, local applications lessen congestion in conjunctivitis, keratitis, and iritis, and hasten the absorption of inflammatory tissue; in lachrymal stricture and abscess, an injection of a solution of the extract is made through the puncta, whereby vascularity is rapidly diminished and any pus present may be expressed through the canal. In ear affections, when applied to the Eustachian tube, congestion is reduced, deafness and tinnitus disappearing. Its hæmostatic properties are well known; it can be used with confidence, since no clots appear. In Addison's disease and asthma, the internal administration of the extract has good results; and in exophthalmic goitre, doses of 2 grains of the dried extract lessen the heart rate, and reduce the size of the thyroid. The normal heart is not affected by the extract, but an intermittent pulse becomes regular, a weak pulse stronger, and the feeble cardiac muscle is remarkably stimulated. All the effects produced are transient, so that repeated applications are necessary, but in all forms of inflammation it is very useful in reducing tension and allaying pains.—Pharm. Journ., July 21, 1900, 57; from B. M. J. Epit., 1/1900, 96.

Suprarenal Extract—Local Anaesthetic Action.—Dr. E. A. Peters records four typical cases, in which acute persistent pain was a distressing feature, which were relieved by the local application of a 10 per cent. solution of suprarenal capsules. In a case of recurrent scirrhus of the mamma, the painting over, at night, of the affected part with the suprarenal capsule solution entirely removed the pain and enabled the patient

to obtain a night's rest. It has been employed since, constantly, night and morning, for three months, and has maintained its efficacy. Opiates and cocaine hydrochloride had both been tried previously in the case, but had failed to give satisfactory results. A case of painful stricture of the œsophagus was similarly relieved by slowly sipping one teaspoonful of the solution. In a third case, that of tuberculosis of the larynx, the solution was sprayed on, with equally good results. In periodontitis, the renewed application of a pledget of wool soaked in the 10 per cent. suprarenal solution gave marked relief, although cocaine, iodine, phenol, and chloroform had each previously failed.—Pharm. Journ., Mar. 30, 1901, 391; from Lancet, *160*, 619.

Cerebrone—A Crystalline Principle from Human Brain.—E. Woerner and H. Thiesfelder have extracted from the human brain a crystalline principle, which they have named "cerebrone." It is obtained by extracting the brain substance with alcohol (45 per cent.) containing 40 per cent. of benzene, or 50 per cent. of chloroform. It is thrown out of the solution on cooling, and after purification forms a white substance free from sulphur, phosphorus and ash, neutral, and insoluble in water. When suspended in alcohol and heated to 50° C., the small globular masses become transformed into fine glistening spangles resembling cholesterin. Cerebrone frits at 130° C. in a capillary tube, turns yellow at 200° C., and melts at 209–212° C. It yields a reducing sugar when boiled with HCl, which is identified as galactose.—Pharm. Journ., June 22, 1901, 773; from Ztschr. Phys. Chem., through Bull. Soc. Chim. (3), *26*, 328.

Lecithin—Therapeutic Value.—Gilbert and Fournier have repeated their former experiments made with lecithin on young warm-blooded animals upon the human subject with results which prove it to be a valuable remedial substance, increasing the appetite, the body weight and strength of tuberculosis patients, as well as those suffering from nervous affections of various kinds. As is well known, lecithin is the most important constituent of the brain substance containing phosphorus, but can also be prepared from the yolk of egg. The experimenters employed lecithin obtained from the latter source, which is described as occurring in white, hygroscopic masses, soluble in alcohol, chloroform and ether, but simply melting, without dissolving, in water. It is administered by the mouth in form of pills containing doses of 0.1 and 0.5 Gm. and subcutaneously in form of a sterilized oil, in doses of 0.05 to 0.15 Gm.—Pharm. Ztg., May 15, 1901, 394; from Nouv. Reméd., 1901, No. 8.

Muscular Juice—Preparation.—A. Lambotte prepares muscular juice as follows: Minced lean meat, 450, is macerated for three hours with cold water, 225, then pressed. The pressed liquid, amounting to 200, has a sp. gr. of 1.010 and gives 3.8 per cent. of residue dried at 120° C. If the maceration be made with equal weights of meat and water, the expressed

liquid will be slightly weaker, giving 3.0 per cent. of residue. It is not then quite exhausted, a second maceration of the marc yielding an expressed liquid giving 2.8 per cent. of dry residue. Muscular juice is becoming an important recuperative aliment in the treatment of wasting disease. The taste of the preparation may be improved by the addition of celery salt.—Pharm. Jour., June 22, 1901, 800; from Journ. de Pharm. d' Anvers, *57*, 81.

Myoserum—A Toxic Liquid from Muscular Tissue.—C. Richet states that the liquid obtained by strong pressure from muscular tissue, which he names *myoserum*, has a marked toxic action when injected hypodermically; large doses, 5 Cc. per kilogramme, occasioning death in twenty four hours, while smaller doses in some cases cause death, but more slowly. This toxic property is entirely destroyed by heat; after coagulation of the albuminoids the serum is absolutely harmless. The author has previously shown that the same substance, when administered to dogs as a food, is not only harmless, but definitely cures tuberculosis in animals artificially inoculated with that disease. It is considered that, when muscle juice is used as a food, the digestive organs or hepatic assimilation modify the toxins present and render them harmless.—Pharm. Jour., Feb. 2, 1901, 105; from Comptes rend., *131*, 1313.

Gelatin—Properties—Removal of Ash-Constituents by Maceration in Water.—C. Th. Mörner finds that gelatin may be washed for several weeks at the ordinary temperature with solutions containing 0.2 to 0.5 per cent. of potash, without in any way losing the property of forming jelly, and without losing its sulphur, and that by this treatment the percentage of ash is reduced from 1.87 to 0.13 or 0.16 per cent. Moreover, the use of potash is not necessary, water alone answering the same purpose. The author, from his experiments, is led to advance the hypothesis that there exist some gelatins containing one atom of sulphur and others two.

Contrary to the statements of many writers, the Millon reaction has always been found to be positive. The author further shows that gelatin is really precipitable by acetic ferrocyanide, but that the precipitate is easily soluble in an excess of the reagent. Dilute solutions are precipitated more easily than concentrated ones. An increase of temperature, even to 30°, or the presence of neutral salts, diminishes or prevents the precipitation. The property of jellifying does not diminish with the increase of ash; this is contrary to the assertions of Nasse. The author contests the reality of the saline digestion, described by Dastre and Floresco. The presence of neutral salts interferes with jellification, but digestion with salts in no way modifies the gelatin.—Chem. News, Jan. 25, 1901, 48; from Zeit. Phys. Chim., vol. xxviii., p. 471.

URINARY COMPOUNDS, &C.

Urine—Absorption of Oxygen.—Berthelot has examined various urines,

and found that they all absorb free oxygen to a greater extent than pure water. Under the conditions of his experiments, as much as 22 Cc. per liter was found to be absorbed. Urine behaves as a reducing liquid, and in this respect it is like a number of tissues of the body, with this difference, that the other tissues exist before the arterial blood passes through them, and take up a portion of the oxygen from this blood, whilst urine is extracted from the blood itself. The absorption of oxygen observed in these experiments is a true chemical phenomenon, and is not due to the agency of microbes, such as those producing acetic fermentation.—Chem. News, Oct. 26, 1900, 207 ; from Compt. rend., *131*, No. 14, Oct. 1, 1900.

Urine—Precautions in Determining Acidity.—The acidity of urine is usually measured by means of phthalein, and compared with a certain equivalent weight of sulphuric acid. Berthelot observes that this method needs some modification. To be accurate this weight ought to be replaced by an equivalent sum of those acids in urine which are susceptible of being estimated by means of phthalein ; but this sum includes several orders of acidity, the acidity of the strong acids, such as hydrochloric and sulphuric, which can be estimated with most common indicators, and the acidity of the feeble acid, such as carbonic, which can be estimated accurately only with certain indicators. When examining it is therefore necessary to use several indicators and compare the results.—Chem. News, Oct. 26, 1900, 207 ; from Compt. rend., *131*, No. 14, Oct. 1, 1900.

Urine—Determination of Uric Acid. — Bellocq determines uric acid as follows : To 250 Cc. of urine from the bulked excretion of twenty-four hours, is added an excess of NaOH solution. After allowing the precipitate to subside, the clear liquid is decanted, shaken with powdered pumice stone and filtered. To 200 Cc. of the clear filtrate, 20 Cc. of a reagent composed of 3 vols. solution of zinc sulphate (1 : 3), 3 vols. solution of soda, and 4 vols. saturated solution of sodium carbonate. If, after stirring, the precipitation is not complete so as to leave a clear supernatant liquid, a little more of the reagent is added. After standing, the precipitate is collected on a filter, transferred to a porcelain capsule, dried, 2 Cc. of HCl saturated with uric acid is added, and the capsule floated in cold water or on a freezing mixture, when the uric acid will crystallize out. When separation is complete, the crystals are drained on cotton in a small funnel, washed with 10 Cc. of alcohol, drained on filter paper, dried and weighed. — Pharm. Jour., Sept. 29, 1900, 361 ; from Jour. Phar. Chim. [6], *12*, 103.

Uric Acid — Action of Iodic Acid and Estimation. — H. Bouillet has studied the reactions between uric acid and iodic acid, and finds that when an excess of the latter is caused to act on uric acid in the presence of water, on heating carbonic acid is evolved, and iodine liberated, the reaction being completed at the boiling point. The carbonic acid so pro-

duced is, molecule for molecule, of uric acid, while a double atom of iodine is set free, and both can be estimated by well-known methods, as can also the excess of iodic acid employed. From his studies of this reaction the author has deduced the following course: The iodic acid decomposes the uric acid, giving first alloxane and urea, then the alloxane itself is hydrated, carbonic acid is given off, and the ammonia formed combines with the excess of iodic acid, leaving as a final result a mesoxalic group in the state of an amide, in accordance with the following equation: $C_4O_3N_2H_2 + H_2O = CO_2 + NH_3 + C_3O_3NH$. The uric acid, in accordance with these observations, can therefore be estimated either by determining the iodine, or the carbonic acid, or the amount of iodic acid consumed, and methods are described contemplating these different ways, but the author gives preference to the last named, which is carried out as follows:

Precipitate the uric acid in the form of insoluble urate of barium by adding to 100 Cc. of urine, previously neutralized with soda, chloride of barium until no more precipitate is formed, then acidulate with 5 Cc. of acetic acid at $\frac{1}{10}$, let stand for fifteen or twenty minutes, filter, and wash the precipitate, which consists of urate, phosphate, and sulphate of barium. Transfer this precipitate into a porcelain crucible, using about 100 to 150 Cc. of water for this purpose; add 20 Cc. of H_2SO_4 at $\frac{1}{10}$, so as to set free the uric acid, then boil. At this moment add 10 Cc. of the titrated solution of I_2O_5, and keep boiling gently until the whole of the iodine is liberated. Sometimes the liquid remains yellow, on account of the presence of the last traces of iodine, which are difficult to remove; this, however, can be easily effected by adding a little marble—the carbonic acid given off carries the iodine with it. After cooling, titrate the undecomposed I_2O_5; for this purpose, 10 Cc. of HCl at $\frac{1}{10}$ and 30 Cc. of KI at $\frac{1}{10}$ are successively added to the cold solution, and the iodine set at liberty is titrated with $\frac{N}{10}$ hyposulphite. The difference between the original volume of the hyposulphite solution, V, and the present volume, v, gives the amount of iodic acid decomposed; this difference multiplied by the factor 0.007 gives the weight of uric acid. In a general way, the formula is $(V—v) \times 0.007 =$ uric acid. The method is simple and rapid, and has proven extremely accurate.—Chem. News, April 19, 1901; from Bull. Soc. Chim. (3), xxv, No. 5.

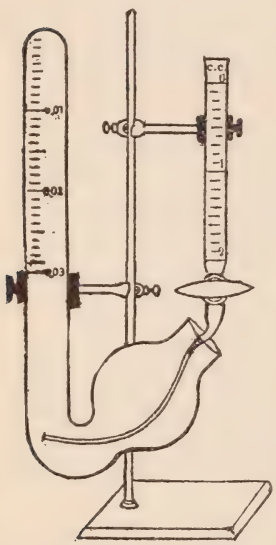
Urine—Detection of Indican.—A. Klett detects indican in urine by adding to 10 Cc. of the secretion 5 Cc. of HCl (25 per cent.) and a few drops of ammonia. A little chloroform is then added. If the urine contains indican, the last-named solvent will be colored blue. Albumen gives a precipitate with the persulphate, and bile pigments give rise to a green ring at the point of junction of the liquids.—Schweiz. Woch. für Pharm., Jan. 19, 1901, 31.

Urine—Detection of Urobilin.—T. Roman and J. Delluc detect the

presence of urobilin in urine thus: 100 Cc. of the urine is shaken out with 20 Cc. of chloroform after acidulating with 8 to 10 drops of acetic acid; 2 Cc. of the clear chloroformic solution is then run off, and 4 Cc. of a 1 : 1,000 solution of zinc acetate in alcohol 95 per cent. is added to it without mixing the liquids. At the line of separation, a characteristic green fluorescence will be obtained in the presence of urobilin, which becomes more evident when viewed against a black background. On shaking, the fluorescence becomes more marked, and the mixture acquires a rose tint. The author has observed that some samples of commercial alcohol give this characteristic reaction with urobilin without the addition of any zinc salt. This he attributes to a minute amount of zinc present, derived from the action of a trace of acetic acid present in the alcohol as an impurity, on the zinc of the galvanized iron drums in which they were contained.—Pharm. Jour., Oct. 20, 1900, 440; from Jour. de Pharm. [6], *12*, 49,

Urea—Simple Apparatus for Estimation.—Daniel F. Wettlin observes that while the Doremus method for the estimation of urea is a simple operation, it is quite difficult to discharge exactly 1 Cc. of urine into the hypobromite solution with an ordinary pipette, and a certain volume of nitrogen also is sure to escape into the bulb. He has overcome these difficulties by modifying Hine's ureometer in the manner shown in the accompanying drawing (Fig. 61). The ureometer and a burette having been clamped to a retort stand in such manner that the point of the burette will be just above the mouth of the ureometer, a piece of glass tube having quite a small bore, bent so that it will reach into the bulb and directly under the column of liquid in the long arm of the ureometer, is attached to the nozzle of the burette, as shown, by the aid of a short section of rubber tubing. The instrument is now ready for use, and any desired quantity of urine can be introduced with accuracy, and without loss of nitrogen.—Merck's Rep., Jan. 1901, 7.

FIG. 61.



Urea—A Specific Antitoxin in Tuberculosis.—Dr. Henry Harper reports that during the last nineteen months he has employed urea in the treatment of tuberculosis with consistently good results, so that he believes it to be a remedy superior to any other at present in use. He has administered it in a large number of cases both hypodermically and internally; in the latter case in doses of 20 grains three times per diem, in

the former, 40 grains dissolved in 4 fluid drachms of sterilized water were injected into the gluteal region. The majority of cases were treated by internal administration of the drug. Instances are cited of remarkable results obtained with the remedy, which have been attended by more success than in any hitherto recorded cases with other substances. Attention was first directed to urea as a probable remedy, from the fact that in all animals and races of mankind which are notoriously subject to tubercle infection, the diet is such that the amount of urea in the system is reduced to a minimum; while those in which a flesh diet is consumed are largely exempt from the disease. The author regards urea as a direct antitoxin for the tubercle bacillus.—Pharm. Journ., April 6, 1901, 423; from Lancet, *160*, 694.

Ureine—A Hitherto Overlooked Constituent of Urine.—According to W. O. Moor, one of the most important organic constituents of urine, which he names "ureine," has been hitherto overlooked, since it is readily decomposed by heat and reagents. It is described as a dense oily fluid having the sp. gr. about 1.27, soluble in water and in alcohol. It begins to decompose at about 80°, and is capable of absorbing large volumes of oxygen. It has a characteristic odor and when applied to the skin produces a sensation of slight burning. It possesses a marked toxic action when injected into animals. The amount present in normal urine is about double that of the urea. It is isolated by evaporating urine at a temperature not above 50° C., until all moisture is driven off; the residue is then treated with silver nitrate, cooled and filtered, from the precipitate formed, washing until the filtrate is colorless. The mixed filtrate is then evaporated at 65° C., until no more vapor arises; it is then mixed with one half its volume of absolute alcohol and sufficient oxalic acid to precipitate the urea. The alcoholic solution is filtered from the precipitate and evaporated again at 55° C., with occasional stirring; the concentrated liquid is then cooled to a low temperature, and separated from the crystals of salts deposited. The filtrate, after washing with absolute alcohol, is treated with a saturated solution of mercurous nitrate and then neutralized with sodium carbonate, finally filtering from the precipitate and evaporating at 55° C. The residue is ureine.—Pharm. Journ., Jan. 5, 1901, 3; from Med. Press, *69*, 315.

Hippuric Acid—Volumetric Determination.—W. A. Cates observes that the estimation of hippuric acid in urine can be conveniently effected by the method of Bunge and Schmiedeberg, in which the residue from the evaporated urine is successively treated with absolute alcohol, acetic ether and petroleum ether, which removes benzoic acid, oxy-acids, phenol, and fat. It is the practice then to purify the hippuric acid in the residue by solution in hot water, crystallization, drying and weighing. The author suggests that the process may be considerably shortened by making it volumetric, which is also probably more accurate. The residue remaining

after the final treatment with petroleum ether is dissolved in hot water and titrated direct with $\frac{N}{10}$NaOH, using phenolphthalein as indicator—the end of the reaction being quite satisfactory, nothwithstanding the presence of a certain amount of urinary pigment. Theoretically 1 Cc. of $\frac{N}{10}$NaOH corresponds to 0.0179 Gm. of hippuric acid, and the figures obtained in several experiments correspond very closely with this.—Chem. News, Mar. 15, 1900, 121.

Bile—A New Test.—Prof. E. H. Bartley finds the ferric chloride-hydrochloric acid test for the presence of indoxyl in urine to be available and extremely delicate and characteristic for the detection of bile in urine and in the feces. If the test is applied to a urine containing bile coloring matters, a beautiful emerald green color is produced. This green coloring matter is insoluble in chloroform, hence does not interfere with the indican test, so that bile and indican can be tested for in the same solution. The test was first observed by the author in examining feces, and was made as follows: An alcoholic extract of the feces was made and filtered clear, to this filtrate a few drops of ferric chloride solution were added, when an intense green color was immediately produced. When the same reaction was tried upon a great many specimens of urine, no sample not containing bile was found to give the green color, whereas in the presence of bile the reaction is invariably produced.—Amer. Drugg., March 11, 1901, 134.

APPENDIX.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1900, TO JULY 1, 1901.

	Annual Dues.	Certificates.
Adamick, Gustave H. . . . . '01	$5 00	
Aimar, Charles P. . . . . '00–'01	10 00	
Allen, E. Floyd . . . . . '00	5 00	
Allison, William O. . . . . '01	5 00	
Amend, Bernard G. . . . . '01	5 00	
Anderson, Samuel . . . . . '00	5 00	
Anderson, William C. . . . . '01	5 00	
Andriessen, Hugo . . . . . '00–'01	10 00	
Aquaro, Joseph . . . . . '01	5 00	
Ardery, Lorimer . . . . . '00–'01	10 00	
Arny, Harry V. . . . . '01	5 00	
Arrington, Homer H. . . . . '99–'00	10 00	
Averill, William H. . . . . '00	5 00	
Axness, Ole M. . . . . '00–'01	10 00	
Bailey, Frederick . . . . . '01	5 00	
Baird, Julian W. . . . . '01	5 00	
Baker, Edwin . . . . . '01	5 00	
Baker, T. Roberts . . . . . '01	5 00	
Balser, Gustavus . . . . . '01	5 00	
Baridon, Louis R. . . . . '01	5 00	
Barnett, Joel J. . . . . '01	5 00	
Bartells, George C. . . . . '00	5 00	
Bartley, Elias H. . . . . '01	5 00	
Base, Daniel . . . . . '01	5 00	
Bassett, Charles H. . . . . '00	5 00	
Baur, Jacob . . . . . '01	5 00	
Bayles, Lewis F. . . . . '00	5 00	
Bayly, Charles A. . . . . '00	5 00	
Beal, James H. . . . . '00–'01	10 00	
Beck, John G. . . . . '00	5 00	
Becker, Charles L. . . . . '00–'01	10 00	
Behrens, Emil C. L. . . . . '00–'01	10 00	
Bell, Emil R. . . . . '01	5 00	
Bell, S. Howard . . . . . '01	5 00	
Benfield, Charles W. . . . . '00–'01	10 00	
Benton, Wilber M. . . . . '01	5 00	
Beringer, George M. . . . . '01	5 00	
Berryhill, Henry P. . . . . '00	5 00	
Betzler, Jacob . . . . . '00	5 00	
Beyschlag, Charles . . . . . '01	5 00	
Bigelow, Clarence O. . . . . '01	5 00	
Billings, Henry M. . . . . '00–'01	10 00	
Bingham, Charles C. . . . . '00	5 00	
Bingham, William E. . . . . '00	5 00	
Blaikie, William . . . . . '00–'01	10 00	
Blake, James E. . . . . '00–'01	10 00	
Blakely, Collins . . . . . '01	5 00	
Blakeley, George C. . . . . '00	5 00	
Blanding, William O. . . . . '01	5 00	
Blank, Alois . . . . . '00	5 00	
Blumauer, Louis . . . . . '00	5 00	
Boeddiker, Otto . . . . . '01	5 00	
Boehm, Solomon . . . . . '00	5 00	
Boerner, Emil L. . . . . '00	5 00	
Borell, Henry A. . . . . '01	5 00	
Bowen, William A. . . . . '99	5 00	
Boyce, Samuel F. . . . . '00	5 00	
Boyd, George W. . . . . '01	5 00	
Amount carried forward	$350 00	

	Annual Dues.	Certificates.
Amount brought forward	$350 00	
Boynton, Herschell . . . . . '00	5 00	
Brack, Charles E. . . . . '01	5 00	
Bradbury, Wymond H. . . . . '01	5 00	
Brandenburger, A. . . . '98–'99–'00	15 00	
Brecht, Frederick A. . . . . '00	5 00	
Brickman, Arthur O. . . . . '01	5 00	
Brisley, Harry . . . . . '00–'01	10 00	
Broe, James A. . . . . '00	5 00	
Brooks, George W. . . . . '01	5 00	
Brown, William A. . . . . '01	5 00	
Brown, William T. . . . . '00	5 00	
Brundage, Albert H. . . . . '00	5 00	
Burg, John D. . . . . '00–'01	10 00	
Burnham, Alfred A., Jr. . . . . '01	5 00	
Burrough, Horace. . . . . '01	5 00	
Butler, Charles H. . . . . '01	5 00	
Butler, Freeman H. . . . . '01	5 00	
Button, Charles E. . . . . '01	5 00	
Byrne, John . . . . . '01	5 00	
Capper, William E. . . . . '99	5 00	
Carslake, George M. . . . . '00	5 00	
Carter, Frank H. . . . . '00	5 00	
Caspari, Charles, Jr. . . . . '01	5 00	
Casper, Thomas J. . . . . '01	5 00	
Cassaday, O. U. . . . . '01	5 00	
Chandler, Charles F. . . . . '01	5 00	
Charropin, Emile L. . . . . '01	5 00	
Cheatham, Thomas A. . . . . '00	5 00	
Claflin, Walter A. . . . . '00–'01	10 00	
Clark, John A. . . . . '00	5 00	
Cline, Raoul R. D. . . . . '01	5 00	
Cobb, Ralph L. . . . . '01	5 00	
Coblentz, Virgil . . . . . '00	5 00	
Cole, Victor L. . . . . '00	5 00	
Collier, William K. . . . '98–'99–'00	15 00	
Collins, Albert B. . . . . '01	5 00	
Cone, John W. . . . . '00	5 00	
Conrath, Adam . . . . . '01	5 00	
Cook, Thomas P. . . . . '01	5 00	
Cornell, Edward A. . . . . '00	5 00	
Corning, Albion J. . . . . '00–'01	10 00	
Cotton, William H. . . . . '99–'00	10 00	
Coupe, Robert E. . . . . '00	5 00	
Cramer, Max . . . . . '01	5 00	
Crampton, Ferd. L. . . . . '01	5 00	
Criswell, Francis M. . . . . '01	5 00	
Crowdle, John E. . . . . '00	5 00	
Culbreth, David M. R. . . . . '00	5 00	
Curry, David W. . . . . '00	5 00	
Curry, Gordon L. . . . . '01	5 00	
Dadd, Robert M. . . . . '01	5 00	
Danek, John F. . . . . '01	5 00	
Davies, Llewellyn P. . . . '00–'01	10 00	
Davis, Charles L. . . . . '01	5 00	
Davis, Eugene M. . . . . '00–'01	10 00	
Davis, William M. . . . . '01	5 00	
Dawson, John H. . . . . '00	5 00	
Amount carried forward	$690 00	

	Annual Dues.	Certificates.
Amount brought forward	$690 00	
Day, William B.....'00	5 00	
De Lang, Alfred ....'00	5 00	
De Lorenzi, Albert...,99–'00–'01	15 00	
Depeyre, Louis N .....'99–'00	10 00	
Devine, John..... .'01	5 00	
Dewender, William H.....'01	5 00	$5 00
Dewoody, William L.....'01	5 00	
Diebert, Thomas I.....'01	5 00	
Diekman, George C.....'01	5 00	
Dilly, Oscar C..... .....'01	5 00	
Dimmitt, Addison ....'01	5 00	
Dimock, Robert H.....'01	5 00	
Dixon, J. Marion.....'01	5 00	
Dobbins, Edward T.....'01	5 00	
Dohme, Alfred R. L.....'01	5 00	
Dohme, C. Louis .....'00–'01	10 00	
Dorr, George W.....'99–'00	10 00	
Doty, Wirt P.....'01	5 00	
Dougherty, Samuel E....'00–'01	10 00	
Douglass, Henry.....'01	5 00	
Downing, Benj. F. Jr.....'00	5 00	
Drew, Walter I.....'00	5 00	
Druehl, Frank A.....'00	5 00	
Duckett, Walter G..... ....'01	5 00	
Duggan, James .....'01	5 00	
Dunn, John A.....'01	5 00	
Dunwody, Richard G....'98–'99	10 00	
Durkee, William C.....'00	5 00	
Dutcher, Alfred L.....'00	5 00	
Eads, Robert I.....'00	5 00	
Easterday, Herbert C.....'01	5 00	
Eberbach, Ottmar.....'00–'01	10 00	
Eberle, Eugene G .....'01	5 00	
Eckstein, Andrew J.....'01	5 00	
Edwards, Frederick B.....'00	5 00	
Eger, George.....'00	5 00	
Ehrlicher, Henry M..... ...'00	5 00	
Eichrodt, Charles W.....'00	5 00	
Eliel, Leo .....'00–'01	10 00	
Elliott, Charles H.....'01	5 00	
Emanuel, Louis.....'00–'01	10 00	
England, Joseph W.....'00	5 00	
Englander, Samuel.....'00	5 00	
Erb, Charles S.....'00	5 00	
Estabrook, Henry A..'99–'00–'01	15 00	
Esters, Von Krakau, Wm....'00	5 00	
Etzel, John L.....'00	5 00	
Evans, Joseph S..... .....'00	5 00	
Ewell, Ervin E.....'01	5 00	
Ewing, Mary S.....'00	5 00	
Eyssell, George.....'01	5 00	
Faber, Walter E.....'01	5 00	
Fairchild, Benjamin T. .....'01	5 00	
Fairchild, Samuel W. .....'01	5 00	
Feidt, George D.....'00	5 00	
Feil, Joseph .....'00	5 00	
Fennel, Charles T. P.....'00	5 00	
Fieber, Gustavus A.....'01	5 00	
Field, William C.....'01	5 00	
Fink, Frederick Wm.....'00	5 00	
Firmin, John C.....'00	5 00	
Fischer, Oscar F.....'98–'99	10 00	
Fisher, Elbert E.....'00	5 00	
Fisher, George W.....'01	5 00	
Flemer, Lewis.....'01	5 00	
Fletcher, John W.....'01	5 00	
Flexon, Charles.....'00	5 00	
Ford, Charles M.....'01–'02	10 00	
Foulke, James.....'00–'01	10 00	
Fox, Peter P.....'01	5 00	
Frames, J. Fuller.....'00	5 00	
Franzoni, Joseph D..... ...'01	5 00	
Fraser, Horatio N.....'01–'02	10 00	
Frauer, Herman E.....'00	5 00	
Freid, Isadore.....'00	5 00	
Amount carried forward	$1145 00	$5 00

	Annual Dues.	Certificates.
Amount brought forward	$1145 00	$5 00
French, Harry B.....'00–'01	10 00	
French, John I..... .. ..'00	5 00	
Frohwein, Richard .....'00	5 00	
Frost, William A.....'00	5 00	
Frye, George C.....'01	5 00	
Gallagher, John C.....'00	5 00	
Gamble, Stewart.....'99–'00–'01	15 00	
Gammon, Irving P.....'00–'01	10 00	
Gane, Eustace H..... .....'00	5 00	
Gano, William H.....'00–'01	10 00	
Gardner, Robert W.....'01	5 00	
Gaus, Charles H.....'00–'01	10 00	
Gayle, John W.....'01	5 00	
Geisler, Joseph F... ....'00–'01	10 00	
Gessner, Emil A.....'01	5 00	
Gill, George .....'01	5 00	
Gilpin, Henry B.....'00	5 00	
Gleim, John C.....'01	5 00	
Glover, William H.....'00	5 00	
Godbold, Fabius C.....'01	5 00	
Godding, John G.....'00–'01	10 00	
Good, James M.....'00	5 00	
Goodale, Harvey G.....'00	5 00	
Gordin, Harry M.....'00	5 00	
Gordon, Frederick T.....'01	5 00	
Gorgas, George A.....'01	5 00	
Gosman, Adam J.....'01	5 00	
Grace, William D.....'00–'01	10 00	
Graham, Clarence M.....'00	5 00	
Grassly, Charles W.....'01	5 00	
Gray, William .....'01	5 00	
Green, Benjamin .....'01	5 00	
Greene, William R.....'01	5 00	
Gregorius, George.....'00	5 00	
Gregory, Willis G.....'00–'01	10 00	
Greiner, William E ..... '00	5 00	
Greve, Charles M.....'01	5 00	
Greyer, Julius ....'00	5 00	
Gross, Charles E.....'01	5 00	
Gross, Edward Z.....'00–'01	10 00	
Grossjohann, Ernst.....'01	5 00	
Guerin, James F.....'00	5 00	
Gundrum, George .....'00–'01	10 00	
Haake, William H.....'01	5 00	
Hall, Edwin B.....'01	5 00	
Hall, Horace B.....'00	5 00	
Hall, Joseph P.....'01	5 00	
Hall, William A.....'00	5 00	
Halstead, Alice B.....'01	5 00	
Hammar, Alrik.. .....'01	5 00	
Hancock, Charles W.....'01	5 00	
Harbaugh, Wilson L.....'00–'01	10 00	
Harper, Robert N.....'01	5 00	
Harter, Isaac F..... '00–'01	10 00	
Hartshorn, Frederick A.....'01	5 00	
Hartwig, Otto J..... '00	5 00	
Hassebrock, Henry F.....'00	5 00	
Hassinger, Samuel E. R.....'01	5 00	
Hatton, Edgar M.....'01	5 00	
Hatton, Ellmore W... .....'01	5 00	
Hauenstein, William.....'00–'01	10 00	
Haussamen, Henry L....'99–'00	10 00	
Haussmann, Fred'k W.....'00	5 00	
Havenhill, L. D.....'01	5 00	
Hay, Charles L.....'00	5 00	
Hay, Edward A.....'01	5 00	
Hayes, Horace P.....'01	5 00	
Hazlett, James L... .....'01	5 00	
Hechler, George L.....'01	5 00	
Heebner, Charles F.....'00	5 00	
Heinemann, Otto.....'00	5 00	
Heinitsh, Sigmund W.....'01	5 00	
Hemm, Francis .....'00	5 00	
Hengst, J. Edwin .....'01	5 00	
Henry, Charles.....'01	5 00	
Amount carried forward	$1600 00	$5 00

	Annual Dues.	Certificates.
Amount brought forward	$1600 00	$5 00
Henry, Charles L. .....'01	5 00	
Henry, Frank C. .....'01	5 00	
Herbst, William P. .....'01	5 00	
Hereth, Frank S. .....'01	5 00	
Heschong, John F. .....'01	5 00	
Hess, Paul L. .....'00–'01	10 00	
Heydenreich, Emile .....'01	5 00	
Hickerson, William H. .....'01	5 00	
Hilton, Samuel L. .....'01	5 00	
Hinrichs, Gustavus D. ....'99–'00	10 00	
Hiriart, Sebastian .....'00	5 00	
Hitchcock, John E. .....'00	5 00	
Hoch, Aquila .....'00–'01	10 00	
Hogan, John J. .....'01	5 00	
Holmes, Henry E. .....'00	5 00	
Hood, Charles I. .....'01	5 00	
Hopkins, Jesse L. ....'99–'00–'01	15 00	
Hopp, Lewis C. .....'00	5 00	
Horn, Wilbur F. .....'00–'01	10 00	
Hover, William A. .....'01	5 00	
Howard, Fleteher .....'00	5 00	
Howson, Arthur B. .....'01	5 00	
Huder, Henry J. .....'00–'01	10 00	
Hudnut, Richard A. .....'00–'01	10 00	
Hudson, Arthur .....'00	5 00	
Huhn, George .....'00–'01	10 00	
Humma, Henry J. .....'00–'01	10 00	
Hurd, John C. .....'01	5 00	
Hurlebaus, George W. .....'01	5 00	
Hurty, John N. .....'00	5 00	
Huston, Charles .....'01	5 00	
Hutton, Harry D. .....'01	5 00	
Hynson, Henry P. .....'01	5 00	
Ink, Charles E. .....'00	5 00	
Jackson, Frank A. .....'01	5 00	
Jacobs, Joseph .....'01	5 00	
Jelliffe, Smith E. .....'00	5 00	
Jones, Alexander H. .....'01	5 00	
Jones, David F. .....'00	5 00	
Jones, James T. .....'00–'01	10 00	
Jones, Simon N. .....'01	5 00	
Jorgensen, Hans C. .....'00	5 00	
Jungmann, Julius .....'00	5 00	
Kaemmerer, William F. .....'01	5 00	
Kalish, Julius .....'01	5 00	
Kalish, Oscar G. .....'01	5 00	
Kauffman, George B. .....'01	5 00	
Keaney, James J. .....'00	5 00	
Kebler, Lyman F. .....'00–'01	10 00	
Keenan, Thomas J .....'01	5 00	
Keeney, Caleb R. .....'01	5 00	
Kelly, George A. .....'00	5 00	
Kemp, Edward .....'01	5 00	
Kennedy, George W. .....'01	5 00	
Kent, Henry A., Jr. .....'01	5 00	
Kettler, Edward, Jr. .....'01	5 00	
Kienth, Hans .....'01	5 00	
Kilmer, Frederick B. .....'01	5 00	
King, Campbell T. .....'00	5 00	
King, George A. N. .....'00	5 00	
Kirchgasser, William C. .....'01	5 00	
Kirkland, Derwentwater .'01–'02	10 00	
Klein, Ernst F. .....'01	5 00	
Klie, G. H. Charles .....'00	5 00	
Kline, Mahlon N. .....'00–'01	10 00	
Knabe, Gustavus A. .....'00	5 00	
Knoebel, Thomas .....'01	5 00	
Knoefel, Bruno .....'01	5 00	
Knoefel, Charles D. .....'01	5 00	
Koch, Julius A. .....'00–'01	10 00	
Koch, Louis .....'01	5 00	
Kolb, William W. .....'01	5 00	
Kornmann, Henry .....'00	5 00	
Kraemer, Henry .....'01	5 00	
Krieger, Philip .....'01	5 00	
Amount carried forward	$2050 00	$5 00

	Annual Dues.	Certificates.
Amount brought forward	$2050 00	$5 00
Krueger, Owen W. .....'00	5 00	
Kuder, William F. .....'01	5 00	
La Pierre, Elie H. .....'01	5 00	
La Wall, Charles H. .'99–'00–'01	15 00	
Laing, Alfred A. .....'00–'01	10 00	
Laird, John .....'01	5 00	
Lamar, Henry J. .....'00	5 00	
Lampa, Robert R. .....'00	5 00	
Lanctot, Henri .....'00	5 00	
Larrabee, John .....'00–'01	10 00	
Lauricella, Felice .....'00–'01	10 00	
Legel, John G. .....'01	5 00	
Legendre, Joseph A. .....'00	5 00	
Lehr, Philip .....'00–'01	10 00	
Levinson, Joseph .....'01	5 00	
Levy, Adolph .....'99–'00	10 00	2 50
Levy, William M. .....'00	5 00	
Lewis, Ernest G. .....'00	5 00	
Lilly, Josiah K. .....'00	5 00	
Lindvall, Gus .....'01	5 00	
Lockie, James A. .....'00	5 00	
Loehr, Theodore C. '98–'99–'00–'01	20 00	
Loomis, John C. .....'00	5 00	
Lord, Frank J. .....'00	5 00	
Lord, Thomas .....'01	5 00	
Lovis, Henry C. .....'00	5 00	
Lovvorn, James L. .....'00	5 00	
Lowell, Edward M. .....'01	5 00	
Lueder, Fritz .....'01	5 00	
Lyon, George C. .....'01	5 00	
Lyons, Isaac L. .....'01	5 00	
Maguire, Eduord S. .....'01	5 00	
Main, Thomas F. .....'01	5 00	
Maisch, Henry .....'00	5 00	
Majer, Oscar .....'00	5 00	
Major, John R. .....'01	5 00	
Mallinckrodt, Edward .....'00	5 00	
Manning, John H. ...'98–'99–'00	15 00	
Mares, Ferdinand L. .....'00	5 00	
Martin, John C. .....'01	5 00	
Martin, Nicholas H. .....'00–'01	10 00	
Mason, Harry B. .....'00	5 00	
Matson, George H., Jr. .....'01	5 00	
Matthews, Charles E. .....'01	5 00	
Matusow, Harry .....'00	5 00	
May, Charles C. .....'00	5 00	
May, Edward .....'01	5 00	
May, Eugene .....'01	5 00	
McClearn, Henry T. .....'00	5 00	
McConnell, Charles H. .....'01	5 00	
McDonald, George .....'00	5 00	
McElhenie, Thomas D. .....'00	5 00	
McGill, John T. .....'01	5 00	
McIntyre, Ewen .....'01	5 00	
McIntyre, William .....'01	5 00	
McKesson, John, Jr. .....'01	5 00	
McLarty, Colin .....'99–'00	10 00	
McMahon, Joseph .....'01	5 00	
McMonies, Thomas L. .....'99	5 00	
Meissner, Frederick W., Jr. ...'01	5 00	
Menk, Charles W. .....'00	5 00	
Mennen, Gerhard .....'00	5 00	
Merrell, Charles G. .....'01	5 00	
Merrell, George .....'01	5 00	
Metz, Abraham L. ...'98–'99–'00	15 00	
Meyer, Martin M. .....'01	5 00	
Michaelis, Gustavus .....'01	5 00	
Millard, David R. .....'01	5 00	
Miller, Charles .....'00	5 00	
Miller, Charles E. .....'01	5 00	
Miller, Emerson R. .....'00	5 00	
Miller, T. Ashby .....'01	5 00	
Miller, William H. .....'01	5 00	
Milligan, Decatur .....'01	5 00	
Miner, Maurice A. .....'00	5 00	
Amount carried forward	$2505 00	$7 50

	Annual Dues.	Certificates.
Amount brought forward.....	$2505 00	$7 50
Mittelbach, William.....'01	5 00	
Moerk, Frank X.....'00–'01	10 00	
Moore, John T.....'01	5 00	
Moore, Silas H.....'00–'01	10 00	
Morison, J. Louis D.....'01	5 00	
Morris, Lemuel I.....'00	5 00	
Morris, Max.....'00	5 00	
Morrison, Joseph E.....'98–'99	10 00	
Mosher, William W.....'00	5 00	
Mueller, Adolphus .....'01	5 00	
Muench, William .....'01	5 00	
Mulford, Henry K .....'01	5 00	
Murphy, John S.....'00	5 00	
Muth, John C..... '01	5 00	
Muth, John S .....'01	5 00	
Myers, Daniel.....'01	5 00	
Nattans, Arthur .....'01	5 00	
Neeley, Guy M.....'01	5 00	
Newman, George A .....'01	5 00	
Newton, Philo W..... .'00	5 00	
Nielson, John.....'01	5 00	
Nipgen, John A. ..... '01	5 00	
Noll, Martin J... .....'00	5 00	
Nordmann, Herman . .....'01	5 00	
Norton, George E.....'00–'01	10 00	
O'Gorman, Theophilus V....'01	5 00	
O'Hare, James.....'01	5 00	
O'Neill, Henry M. .....'00	5 00	
Oberdeener, Samuel.....'00–'01	10 00	
Ohliger, Lewis P.....'99–'00	10 00	
Oleson, Olaf M.....'00	5 00	
Oliver, William M.....'01	5 00	
Orton, Ingomar F.....'01	5 00	
Osmun, Charles A.....'00	5 00	
Osseward, Cornelius .....'00'–01	10 00	
Ottinger, James J.....'01	5 00	
Otto, John N. W .....'00–'01	10 00	
Otto, Theodor G. E.... .....'01	5 00	
Parisen, Allen C. .....'99–'00	10 00	
Partridge, Frank R.....'00	5 00	
Patrick, Elmer A.....'01	5 00	
Patten, Eustis.....'00	5 00	
Pattison, George H.....'00	5 00	
Patton, John F.....'01	5 00	
Pauley, Frank C .....'00	5 00	
Payne, George F.....'00–01	10 00	
Peacock, Bertha L.....'01	5 00	
Peacock, Josiah C.....'01	5 00	
Pearce, Howard A.... .....'01	5 00	
Pearman, William E.....'99–'00	10 00	
Pearson, Joseph F.....'99–'00	10 00	
Pease, Autumn V.....'00'–01	10 00	
Peck, George L.....'01	5 00	
Perkins, Benjamin A..'99–'00–'01	15 00	
Perkins, C. William.....'00–'01	10 00	
Peter. Minor C.....'01	5 00	
Petsche, Bismarck .....'99–'00	10 00	
Pfaff, Franz.....'01	5 00	
Phillips, Carrie Elizabeth....'01	5 00	
Phillips, Charles W.....'01	5 00	
Pierce, William H .....'00–'01	10 00	
Pilson, Abram O.....'01	5 00	
Pitt, John R..... ...'00–'01	10 00	
Plaut, Albert.....'01	5 00	2 50
Plenge, Henry ....'00	5 00	
Porter, Millett N.....'00	5 00	
Potter, William R ....'00	5 00	
Potts, David G.....'01	5 00	
Preissler, Henry W.....'00	5 00	
Prescott, Albert B.....'01	5 00	
Price, Charles H.....'00–'01	10 00	
Price, Joseph.....'00–'01	10 00	
Prieson, Adolph. .....'00	5 00	
Puckner, William A.....'01	5 00	
Quackinbush, Ben. F.....01	5 00	
Amount carried forward.....	$2985 00	$10 00

	Annual Dues.	Certificates.
Amount brought forward.....	$2985 00	$10 00
Quandt, Arthur A.....'01	5 00	
Quandt, Ernest E.....'01	5 00	
Raeuber, Edward G.....'00–'01	10 00	
Rains, A. Brown.....'00	5 00	
Ramaley, Francis .....'01	5 00	
Randall, Frank O .....'99	5 00	
Rapelye, Charles A.....'00	5 00	
Rauschenberg, Sidney.... ..'00	5 00	
Rauschkolb, John.....'99	5 00	
Redsecker, Jacob H. ....'00–'01	10 00	
Reed, Willoughby H.....'01–'02	10 00	
Reidy, Michael.....'00	5 00	
Reynolds, Howard P.....'01	5 00	
Reynolds, John J.....'00	5 00	
Rhode, Rudolph E .....'01	5 00	
Richardson, Horatio S.....'01	5 00	
Richardson, Samuel W ..... '00	5 00	
Richardson, Thomas L.....'00	5 00	
Richardson, Willard S.....'01	5 00	
Riddell, Benjamin F.....'01	5 00	
Robertson, Felix O.....'00	5 00	
Robins, Wilbur F.....'00	5 00	
Robinson, Ernest F.....'00	5 00	
Rockefeller, Lucius.....'01	5 00	
Roe, William G.....'01	5 00	
Rogers, Arthur H. .....'00	5 00	
Rogers, Henry H.....'00	5 00	
Rogers, William H .....'00–'01	10 00	
Root, Wilfred F. .....'01	5 00	
Rosenthal, David A.....'01	5 00	
Rosenzweig, Benjamin.....'01	5 00	
Rowlinski, Robert A.....'00	5 00	
Ruddiman, Edsel A.....'01	5 00	
Ruenzel, Henry G.....'01	5 00	
Ruppert, John .....'00	5 00	
Rusby, Henry H.....'01	5 00	
Sadtler, Samuel P .....'01	5 00	
Sargent, Ezekiel H.....'00	5 00	
Sauer, Louis W.....'00–'01	10 00	
Sauerhering, Rudolph A.....'01	5 00	
Sawyer, Charles H.....'01	5 00	
Sawyer, William F.....'00–'01	10 00	
Sayre, Edward A.....'00–'01	10 00	
Sayre, Lucius E .....'01	5 00	
Sayre, William H.....'00	5 00	
Schaefer, Emil A.....'01	5 00	
Schafer, George H .....'00	5 00	
Schafhirt, Adolph J.....'01	5 00	
Scherer, Andrew .....'01	5 00	
Scherling, Gustav..... '00–'01	10 00	
Schieffelin, William J.....'00–'01	10 00	
Schiemann, Edward B..... '01	5 00	
Schimpf, Henry W.....'01	5 00	
Schlaepfer, Henry J.....'01	5 00	
Schlotterbeck, Augustus G...'01	5 00	
Schlotterbeck, Julius O .....'01	5 00	
Schmid, Henry.....'00–'01	10 00	
Schmidt, Frederick M .....'01	5 00	
Schmidt, Joseph H.....'00–'01	10 00	
Schmidt, Valentine.....'00	5 00	
Schmidt, George J. F.....'01	5 00	
Schmitter, Jonathan..... '00	5 00	
Schneider, Albert.....'00	5 00	
Schoenhut, Christie H.....'01	5 00	
Schoettlin, Albert J.....'01	5 00	
Schrader, August C .....'00–'01	10 00	
Schrank, C. Henry.....'01	5 00	
Schreiner, Oswald.....'01	5 00	
Schueller, Frederick W.....'01	5 00	
Schuh, Paul G..... .....'01	5 00	
Schulze, Louis.....'01	5 00	
Schurk, Louis .....'00	5 00	
Schweickhardt, Richd.'98'–99–'00	15 00	
Scott, William H.....'01	5 00	
Scoville, Wilbur L..... ..'01	5 00	
Amount carried forward	$3430 00	$10 00

	Annual Dues.	Certificates.
Amount brought forward	$3430 00	$10 00
Searby, William M..... '00	5 00	
Seinsoth, John J.	.....	5 00
Selzer, Eugene R..... '01	5 00	
Semphill, Walter M. ..... '99	5 00	
Serodino, Herman ..... '01	5 00	
Shafer, Ervin C. ..... '01	5 00	
Shannon, Thomas R. A..... '00	5 00	
Sharples, Stephen P. ..... '01	5 00	
Shaw, Robert J..... '00	5 00	
Sherman, Charles R..... '01	5 00	
Sherwood, Henry J..... '01	5 00	
Shoemaker, Richard M..... '01	5 00	
Shreve, John A..... '00–'01	10 00	
Shurtleff, Israel H. ..... '00–'01	10 00	
Siegenthaler, Harvey N..'00–'01	10 00	
Simon, William ..... '01	5 00	
Simonson, William ...'99–'00–'01	15 00	
Simpson, William..... '99–'00	10 00	
Simson, Francis C. ..... '00	5 00	
Skelly, James J..... '00–'01	10 00	
Skinner, William H. ..... '00	5 00	
Slade, Harry A..... '01	5 00	
Slater, Frank H..... '00	5 00	
Smith, Charles B..... '00	5 00	
Smith, Clarence P. ..... '00	5 00	
Smith, Edward N..... '01	5 00	
Smith, Edward S..... '99	5 00	
Smith, Lauriston S. ..... '01	5 00	
Smith, Linville H. ..... '00	5 00	
Smith, White G..... '98–'99	10 00	
Smith, Willard A..... '00–'01	10 00	
Smithson, David E..... '00–'01	10 00	
Sniteman, Charles C..... '00	5 00	
Snow, Charles W..... '01	5 00	
Sohrbeck, G. Henry..... '01	5 00	
Sohrbeck, George W..... '01	5 00	
Solomons, Isaiah A..... '01	5 00	
Sombart, John E. ..... '00	5 00	
Sorda, Thomas V..... '01	5 00	
Spalding, Warren A. ..... '01	5 00	
Sperry, Herman J..... '01	5 00	
Sprague, Wesson G..... '01	5 00	
Squibb, Edward H..... '01	5 00	
St. Jacques, Gaston ..... '01	5 00	
St. John, Sydney S..... '01	5 00	
Staebler, Richard..... '00	5 00	
Staehle, Louis L. ..... '00	5 00	
Stahlhuth, Ernst H. W..... '00	5 00	
Stamford, William H..... '00	5 00	
Stange, Carl F..... '00	5 00	
Staudt, Louis C..... '00–'01	10 00	
Stedem, Frederick W. E. ....'01	5 00	
Steinhauer, Frederick....'99–'00	10 00	
Stevens, Alviso B..... '01	5 00	
Stoddart, Thomas ..... '01	5 00	
Stott, Samuel T. ..... '01	5 00	
Stoughton, Dwight G..... '00	5 00	
Stowell, Daniel..... '00	5 00	
Stroup, Freeman P..... '01	5 00	
Sweet, Caldwell ..... '01	5 00	
Symonds, Arthur H. ..... '00	5 00	
Takamine, Jokichi..... '00–'01	10 00	
Taylor, Augustus C. ..... '01	5 00	
Taylor, George E..... '01	5 00	
Taylor, Mallory H ..... '00	5 00	
Thomas, Daniel J. ..... '01	5 00	
Thomas, Robert, Jr..... '01	5 00	
Thomasson, Anders ..... '01	5 00	
Thompson, William S..... '01	5 00	
Thorn, Henry P..... '01	5 00	
Thurston, Azor ..... '00	5 00	
Tigner, James O..... '00–'01	10 00	
Tilden, Amos K ..... '00	5 00	
Tobin, John M..... '00	5 00	
Todd, Albert M. ..... '01	5 00	
Amount carried forward	$3870 00	$15 00

	Annual Dues.	Certificates.
Amount brought forward	$3870 00	$15 00
Topley, James ..... '01	5 00	
Topping, Charles O..... '01	5 00	
Torbert, Willard H..... '01	5 00	
Tracy, David W..... '00	5 00	
Treat, Joseph A..... ...'01	5 00	
Treherne, John C..... '00	5 00	
Troxler, Constantine, Jr. ....'01	5 00	
Truax, Charles..... .....'00	5 00	
Tsheppe, Adolph.....'98–'99–'00	15 00	
Tucker. Greenleaf R..... '00	5 00	
Turrell, Judson W..... '00	5 00	
Tuthill, Frederic P..... '00	5 00	
Uhlich, Ferdinand G..... '00	5 00	
Van Winkle, Abraham..... '00	5 00	
Vargas, Jorge .....'00–'01	10 00	
Varney, Edward F..... '00	5 00	
Vaughan, Parry W..... '99–'00	10 00	
Vitt, Rudolph S..... '00	5 00	
Voigt, Joseph F. ..... '01	5 00	
Vonachen, Frank H. ..... '00	5 00	
Vordick, August H..... '00	5 00	
Voss, George W..... '01	5 00	
Votteler, William ..... '01	5 00	
Waddell, Minor T..... '00	5 00	
Wagner, Henry ..... '98	5 00	
Walbrach, Arthur ..... '00	5 00	
Walker, John P. ..... '01	5 00	
Walker, William J..... '01	5 00	
Wall, Otto A..... '00	5 00	
Walter, Charles A. ..... '00	5 00	
Walts, Charles C..... '00	5 00	
Wangler, Conrad D..... '01	5 00	
Wanous, Josie ..... '00	5 00	
Ward, A. Jae..... '00–'01	10 00	
Ward, Charles A. ....'99–'00–'01	15 00	
Ware, Charles H. ..... '00	5 00	
Warn, William E..... '01	5 00	
Warren, William M..... '01	5 00	
Watson, Herbert K..... '00	5 00	
Watson, Sidney P. ..... '01	5 00	
Watt, George H..... '00	5 00	
Watters, Henry..... '00	5 00	
Weaver, Francis M..... '00	5 00	
Webb, William H. ..... '01	5 00	
Webber. J. LeRoy ..... '01	5 00	
Weidemann, Chas. A..... '01	5 00	
Weller, Franklin P..... '01	5 00	
Wendell, Henry E..... ....'01	5 00	
Wenzell, William T..... '01	5 00	
Werner, Rudolf C. ..... '00	5 00	
Wescott, William C..... '00	5 00	
West, Charles A..... '00	5 00	
Wetterstroem, Albert..... '00	5 00	
Wetterstroem, Theodore D. .'01	5 00	
Wheeler, William D..'99–'00–'01	15 00	
Whelpley, Henry M ..... '00	5 00	
Whitcomb, Frederick E..... '00	5 00	
White, George H..... '99–'00	10 00	
White, Herbert E..... '01	5 00	
White, Richard E..... '00	5 00	
Whitney, Edgar F..... '00	5 00	
Wichelns, Frederick. ..... '01	5 00	
Wickham, William H..... '01	5 00	
Wiesel, John M. ..... '00	5 00	
Wilbur, Lot..... '01	5 00	
Williams, Charles T. ..... '99	5 00	
Williams, George G. ..... '00	5 00	
Williams, John K..... '00	5 00	
Williams, Richard W..... '01	5 00	
Williams, William H..... '00	5 00	
Williamson, Lee..... '99–'00	10 00	
Wittich, Matthew H..... '00	5 00	
Wittmer, Joseph W., Jr..'00–'01	10 00	
Wood, Alonzo F., Jr..... '01	5 00	
Wood, Edward S..... '01	5 00	
Amount carried forward.....	$4305 00	$15 00

	Annual Dues.	Certificates.
Amount brought forward.....	$4305 00	$15 00
Wood, James P.....'01	5 00	
Wood, John W..... .....'01	5 00	
Wood, Mason B.....'98–'99–'00	15 00	
Woodman, Walter I. .....'01	5 00	
Woods, Charles H. A.....'00	5 00	
Woodworth, Charles B. ..'00–'01	10 00	
Wooten, Thomas V. .....'00–'01	10 00	
Wuensch, Charles.....'00	5 00	
Amount carried forward.....	$4365 00	$15 00

	Annual Dues.	Certificates.
Amount brought forward.....	$4365 00	$15 00
Wulling, Frederick J.....'00	5 00	
Wurmb, Theodore H. .....'00	5 00	
Ziegler, Philip M. .....'00–'01	10 00	
Zimmermann, Albert .....'01	5 00	5 00
Zimmermann, Bernard.....'01	5 00	
Zoeller, Edward V.....'01	5 00	
Zuenkeler, J. Ferd .....'01	5 00	
Zwick, Karl G.....'01	5 00	
Totals.....	$4410 00	$20 00

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-NINTH ANNUAL MEETING, HELD AT ST. LOUIS, MO., WITH THE NAMES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Name.	*President.*	*Secretary.*
California	Gaston E. Bacon	Jno. Calvert.
Chicago	A. S. Draper	W. B. Day.
Cleveland	E. A. Schellentrager	Joseph Feil.
Louisville	Louis Rominger	Gordon L. Curry.
Maryland	Chas. E. Dohme	Chas. H. Ware.
Massachusetts	Wm. H. Puffer	Wm. D. Wheeler.
National	A. J. Schafhirt	W. H. Bradbury.
New York	Chas. F. Chandler	Thos. F. Main.
Ontario	Jas. F. Roberts	I. T. Lewis.
Philadelphia	Howard B. French	C. A. Weidemann.
St. Louis	H. S. Rohlfing	Wm. C. Bolm.

SCHOOLS OF PHARMACY.

Medico-Chirurgical College	Philadelphia, Pa.	Seneca Egbert, *Dean.*
Purdue University	Lafayette, Ind.	Arthur L. Green, *Dean.*
University College of Medicine	Richmond, Va.	J. Allison Hodges, *Dean.*
University of Iowa	Iowa City	E. L. Boerner, *Dean.*
University of Michigan	Ann Arbor, Mich.	A. B. Prescott, *Dean.*
University of Minnesota	Minneapolis, Minn.	F. J. Wulling, *Dean.*

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

Name.	*President.*	*Secretary.*
Philadelphia	John H. Hahn	Wm. E. Krewson.

STATE PHARMACEUTICAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Arkansas	Wm. R. Appleton	L. K. Snodgrass.
Connecticut	Chas. Fleischner	Chas. A. Rapelye.
Georgia	W. S. Elkin, Jr.	C. T. King.
Illinois	Walter H. Gale	R. N. Dodds.
Indiana	Chas. O. Prutzman	A. Timberlake.
Iowa	E. B. Tainter	Fletcher Howard.
Kansas	F. A. Snow	E. E. Lair.
Kentucky	John L. Clark	J. W. Gayle.

Name.	*President.*	*Secretary.*
Louisiana	Walter T. Taylor	W. P. Duplantis.
Maine	Frank R. Partridge	M. L. Porter.
Maryland	Louis Schulze	O. C. Smith.
Massachusetts	L. G. Heinritz	J. F. Guerin.
Minnesota	Stewart Gamble	E. B. Wilson.
Missouri	Otto F. Claus	H. M. Whelpley.
Nebraska	P. Strausbaugh	W. M. Tenner.
New Jersey	J. Foulke	F. C. Stutzlen.
New York	Thos. Stoddart	J. B. Todd.
North Carolina	E. W. O'Hanlon	P. W. Vaughan.
Oklahoma	Fred'k Reed	F. M. Weaver.
Ohio	John C. Firmin	Lewis C. Hopp.
Pennsylvania	Wm. L. Cliffe	J. A. Miller.
Texas	E. G. Eberle	R. H. Walker.
Vermont	A. L. Dutcher	Chas. W. Ward.

NATIONAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Retail Druggists	Wm. C. Anderson	T. V. Wooten.

LOCAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Germ. Apoth. Society of New York City	C. F. Schleussner	Sidney Faber.
Kings County Pharm. Society	O. C. Kleine, Jr.	F. P. Tuthill.
Manhattan Pharm. Assoc.	J. M. Pringle, Jr.	S. V. B. Swann.
Philadelphia Assoc. Retail Druggists	W. A. Rumsey	F. T. Gordon.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT ST. LOUIS, MO.

Names of delegates indicated by *; delegates not members by *†.

Abbett, Wm. A., Duluth, Minn.
*Anderson, Wm. C., Brooklyn, N. Y.
Ardery, L., Hutchinson, Kan.
Averill, Wm. H., Frankfort, Ky.
*Bamford, M. W., Philadelphia, Pa.
Bartells, Geo. C., Camp Point, Ill.
Bartmer, A. H., St. Louis, Mo.
Batt, Bruno, St. Louis, Mo.
Beal, Jas. H., Scio, O.
Berryman, Wm. F., St. Louis, Mo.
Beyschlag, Chas., La Crosse, Wis.
Blank, Alois, St. Louis, Mo.
Bœhm, Solomon, St. Louis, Mo.
*Boerner, Emil L., Iowa City, Ia.
*Bond, J. B., Sr., Little Rock, Ark.
Brandenberger, A., Jefferson City, Mo.
Breunert, Aug., Kansas City, Mo.
Burns, E. M., Mason City, Ia.
*Case, Edw. W., Pictou, Can.
*Caspari, Chas., Jr., Baltimore, Md.
Chesnutt, J. H., Hot Springs, Ark.
Claus, O. F., St. Louis, Mo.
*Coblentz, Virgil, New York City, N. Y.
Cook, Earl, Cincinnati, O.
Cook, Thos. P., New York City, N. Y.
Craig, W. P., Indianola, Miss.
Crecelius, C. E., New Albany, Ind.
Deck, L. C., Girard, Ill.
*Dewoody, Wm. L., Pine Bluff, Ark.
*Diehl, C. Lewis, Louisville, Ky.
*Dohme, Chas. E., Baltimore, Md.
Duering, H. C., St. Louis, Mo.
Dunn, John A., Brooklyn, N. Y.
*Eberle, E. G., Dallas, Texas.
Eberle, H. T., Watertown, Wis.
Ebert, Albert E., Chicago, Ill.
Eccles, R. G., Brooklyn, N. Y.
Eilbracht, W. E., Waterloo, Ill.
Elbrecht, O. H., St. Louis, Mo.
Eliel, Leo, South Bend, Ind.
England, Jos. W., Philadelphia, Pa.
Etzel, John L., Clear Lake, Ia.
Euler, F. C., St. Louis, Mo.
Falck, J. C., St. Louis, Mo.
Federmann, W. M., Kansas City, Mo.
Fischer, Henry, St. Louis, Mo.
Fischer, Richard, Madison, Wis.
Frerichs, F. W., St. Louis, Mo.
Fricke, F. H., St. Louis, Mo.
Friedewald, H. W., St. Louis, Mo.
Gaesser, T. T., Troy, Ind.
Gale, Walter H., Chicago, Ill.
*Gayle, J. W., Frankfort, Ky.
Good, Jas. M., St. Louis, Mo.
Gordin, H. M., Cincinnati, O.
Gray, M. M. (Mrs.), Chicago, Ill.
Grewe, L. F., St. Louis, Mo.
Hagee, Wm. P., St. Louis, Mo.
Hagenow, Theo. F., St. Louis, Mo.
Hahn, C. W. J. H., St. Louis, Mo.
Hall, M. S. (Mrs.), Chicago, Ill.
*Hallberg, C. S. N., Chicago, Ill.
Hancock, Chas. W., Langhorne, Pa.
Hart, Joseph, Jackson, Miss.
Hassebrock, H. F., St. Louis, Mo.
Hauenstein, Wm., New York City, N. Y.
Hemm, Francis, St. Louis, Mo.
Hemm, Louis P., Kirkwood, Mo.
Hereth, F. S., Chicago, Ill.
Heschong, Jno. F., Peoria, Ill.
Hess, Paul L., Kansas City, Mo.
Hinrichs, C. G., St. Louis, Mo.
*Hinrichs, Gust. D., St. Louis, Mo.
Hinton, R. G., St. Louis, Mo.
Hoch, Aquila, Philadelphia, Pa.
Holliday, F. E., Topeka, Kan.
*Holzhauer, Chas., Newark, N. J.
*Hope, R. L., Centralia, Mo.
Houghton, E. M., Detroit, Mich.
*Howard, Fletcher, Des Moines, Ia.

Hurty, J. N., Indianapolis, Ind.
*Hynson, H. P., Baltimore, Md.
Ilhardt, W. K., St. Louis, Mo.
James, F. L., St. Louis, Mo.
Kæmmerer, W. F., Columbus, O.
Kaltwasser, Aug. P., St. Louis, Mo.
Kebler, Lyman F., Philadelphia, Pa.
Kennedy, Geo. W., Pottsville, Pa.
Kinney, C. N., Des Moines, Ia.
*Klein, C. F., Hot Springs, Ark.
Knoebel, Thos., East St. Louis, Ill.
Knox, J. W. T., Detroit, Mich.
Koch, J. A., Pittsburg, Pa.
Koeneke, Chas. H., St. Louis, Mo.
*Kraemer, Henry. Philadelphia, Pa.
Kremers, Edw., Madison, Wis.
*Layton, Thos., St. Louis, Mo.
Lemberger, Jos. L., Lebanon, Pa.
Le Richeux, A. C., Duluth, Minn.
*Lillie, F. B., Guthrie, Okla. Ter.
Lindvall, Gus., Moline, Ill.
Lloyd, J. U., Cincinnati, O.
*Loehr, Theo. C., Carlinville, Ill.
*Lowe, C. B., Philadelphia, Pa.
Lyons, A. B., Detroit, Mich.
Macy, S. R., Des Moines Ia.
Mason, H. B., Detroit, Mich.
Matthews, Chas. E., Chicago, Ill.
May, Chas. C., St. Louis, Mo.
Mayo, C. A., New York, N. Y.
Mehl, H. W., Leavenworth, Kan.
* Meissner, F. W., La Porte, Ind.
*† Mentzer, H. H., Philadelphia, Pa.
* Merrell, Chas. G., Cincinnati, O.
Merrell, Geo. R., St. Louis, Mo.
Merrem, Chas. D., St. Louis, Mo.
Methudy, Jos. P., St. Louis, Mo.
Meyer, Chas. L., Baltimore, Md.
Meyer, C. F. G., St. Louis, Mo.
Meyer, Theo. F., St. Louis, Mo.
* Miller, T. Ashby, Richmond, Va.
Milliken, Jno. S., St. Louis, Mo.
Minner, L. A., Murphysboro, Ill.
Mittelbach, Wm., Booneville, Mo.
* Morgan, A. L. Camden, Ark.
Moore, Josh F., Meridian, Miss.
Morse, Edw. W., Mount Vernon, Ill.
Mueller, Ambrose. Webster Groves, Mo.
Murphy, J. S., Pontiac, Ill.
*†Nake, Paul M., St. Louis, Mo.
* Noll, Mathias, Atchison, Kans.
Noll, M. J., St. Louis, Mo.
Oldberg, Oscar, Chicago, Ill.
Otto, Theo. E., Columbus, Ind.
Patten, Eustis, Carbondale, Ill.
Patton, Jno. F., York, Pa.
Pauley, Frank C., St. Louis, Mo.
Payne, Geo. F., Atlanta, Ga.
Pettit, Henry M., Carrollton, Mo.
Pieck, E. L., Covington, Ky.
*†Plump, Fred'k H., New York, N. Y.
*Puckner, W. A., Chicago, Ill.
*Rapelye, Chas. A., Hartford, Conn.
Reilly, Robert C., St. Louis, Mo.
Remington, Jos. P., Philadelphia, Pa.
Remington, J. Percy, Brooklyn, N. Y.
Riley, C. M., Alton, Ill.
Riley, Russell, St. Louis, Mo.
*Roberts, Jas. F., Parkhill, Ontario, Can.
Rose, Herman L., Columbia, Ill.
*Ryan, Frank G., Detroit, Mich.
*Samson, Max, New Orleans, La.
*Sander, Enno, St. Louis, Mo.
*Sayre, Lucius E., Lawrence, Kan.
Sayre, Edw. A., New York, N. Y.
Schneider, Albert, Chicago, Ill.
Schoenthaler, J. P., St. Louis, Mo.
Schreiber, August, Tell City, Ind.
Schreiner, Oswald, Madison, Wis.
*Schuh, Paul G., Cairo, Ill.
Schurk, Louis, St. Louis, Mo.
* Scoville, Wilbur L., Boston, Mass.
Searby, Wm. M., San Francisco, Cal.
Seitz, L. A., St. Louis, Mo.
Sennewald, E. A., St. Louis, Mo.
Shendal, E. E., Hot Springs, Ark.
* Sheppard, S. A. D., Boston, Mass.
Sloan, Geo. W., Indianapolis, Ind.
Spilker, H. F. A., St. Louis, Mo.
Stahlhuth, Ernst, Columbus, Ind.
* Stedem, F. W. E., Philadelphia, Pa.
Stegner, Emil, St. Louis, Mo.
Steinmeyer, Wm. O., Carlinville, Ill.
* Stevens, A. B., Ann Arbor, Mich.
Stille, A. H., St. Louis, Mo.
Stone, C. G., Mt. Vernon, N. Y.
* Sturmer, J. W., Lafayette, Ind.
Sultan, F. W., St. Louis, Mo.
* Thompson, Wm. S., Washington, D. C.
Tontz, Geo. W., St. Louis, Mo.
Uhlich, F. G., St. Louis, Mo.
* Vitt, R. S., St. Louis, Mo.
Voiss, Arcadius, Chicago, Ill.
Vordick, Aug. H., St. Louis, Mo.

Walbridge, Cyrus P., St. Louis, Mo.
Wall, O. A., St. Louis, Mo.
* Wanous, J. A. (Miss), Minneapolis, Minn.
Weber, Peter J., St. Louis, Mo.
Wendt, Wm. C., Columbus, O.
Wesner, H. C., Windsor, Mo.
Whelpley, H. M., St. Louis, Mo.
Whitcomb, F. E., St. Louis, Mo.
Wolff, Edw. H., St. Louis, Mo.
* Wooten, Thos. V., Chicago, Ill.
Wright, Chas. L., Webb City, Mo.
Wunderlich, Edw., New Orleans, La.
Wurmb, Theo. H., St. Louis, Mo.
de Wyl, Fredrica (Miss), Jefferson City, Mo.
Zimmermann, Albert, Peoria, Ill.

LIST OF NEW MEMBERS.

Abbett, Wm. Allen, Duluth, Minn.
Ameling, F. H., St. Louis, Mo.
Anewalt, Ellsworth Q., Philipsburg, N. J.
Appleton, Wm. R., El Dorado, Ark.
Arnett, Wm. Newton, Indianapolis, Ind.
Ballagh, Wilfred T., Nevada, Mo.
Bamford, Melvin W., Tioga, Phila., Pa.
Bard, Wm. E., Sedalia, Mo.
Barth, Henry H., Lincoln, Neb.
Bartmer, Adolph H., St. Louis, Mo.
Batt, Bruno, St. Louis, Mo.
Berryman, Wm. E., St. Louis, Mo.
Bohmansson, Robert H., Arcata, Cal.
Bowen, Cyrus W., Plattsburg, Mo.
Breunert, August, Kansas City, Mo.
Brookes, Virginia C. (Miss), Waelder, Tex.
Burrough, Horace, Jr., Baltimore, Md.
Case, Edward W., Pictou, Can.
Chesnutt, James H., Hot Springs, Ark.
Claus, Otto F., St. Louis, Mo.
Cone, Earl H., Cincinnati, O.
Cook, E. Fullerton, Philadelphia, Pa.
Craig, Wm. P., Indianola, Miss.
Daggett, Volney C., New York City, N. Y.
Day, Edward J., Boston, Mass.
Deck, Lewis C., Girard, Ill.
Duering, Henry C., St. Louis, Mo.
Dunham, Andrew A., Northfield, Vt.
Dye, Clair A., Columbus, O.
Eberle, H. T., Watertown, Wis.
Edelen, Charles A., Louisville, Ky.
Eilbracht, Wm. E., Waterloo, Ill.
Elbrecht, O. H., St. Louis, Mo.
Euler, Fred'k C., St. Louis, Mo.
Federmann, Wm. M., Kansas City, Mo.
Feick, Charles, Baltimore, Md.
Fischer, Henry, St. Louis, Mo.
Fischer, Richard, Madison, Wis.
Foster, John B., Newark, N. J.
Frerichs, F. W., St. Louis, Mo.
Fricke, Fred'k H., St. Louis, Mo.
Friedewald, Hermann W., St. Louis, Mo.
Funsch, Oliver J., St. Louis, Mo.
Gaesser, Theodore T., Troy, Ind.
Gale, Walter H., Chicago, Ill.
Garber, Elmer F. W., Mt. Joy, Pa.
Gilchrist, Nellis R., Wakonda, So. Dak.
Graf, Carl A., Salina, Kan.
Gray, Margaret M. (Mrs.), Chicago, Ill.
Grewe, Louis F., St. Louis, Mo.
Griffiths, Joseph, Kansas City, Mo.
Gross, Wm. O., Fort Wayne, Ind.
Haffner, Jean C., St. Louis, Mo.
Hagee, Wm. P., St. Louis, Mo.
Hagenow, Theodore F., St. Louis, Mo.
Hahn, Charles W. J. H., St. Louis, Mo.
Hall, Mary S. (Mrs.), Chicago, Ill.
Hansen, Hans, Logan, Ia.
Hart, Joseph, Jackson, Miss.
Heinrich, Max P., St. Louis, Mo.
Hinrichs, Carl G., St. Louis, Mo.
Hinton, Rufus G., St. Louis, Mo.
Hollander, Joseph M., Braddock, Pa.
Hope, Robert L., Centralia, Mo.
Hummel, John A., New Madrid, Mo.
Ilhardt, Wm. K., St. Louis, Mo.
Jacobs, Charles C., Ciego de Avila, Cuba.
Johnson, Ralph H., Allegheny, Pa.
Judd, Albert F., Knoxville, Pittsburg, Pa.
Judge, Chas. R., St. Louis, Mo.
Kaltwasser, August P., St. Louis, Mo.
Kerns, Wm. B., Bunceton, Mo.
King, Ferdinand H., Delphos, O.
King, R. B., Helena, Ark.
Kinney, Charles N., Des Moines, Ia.
Koenecke, Charles H., St. Louis, Mo.
Lamar, Wm. R., St. Louis, Mo.
Le Richeux, A. Charles, Duluth, Minn.
Lindly, John M., Winfield, Ia.
Long, John P., Philippine Islands.
Mayo, Frederick W., Memphis, Tenn.
Mente, A. W., Kansas City, Mo.
Merrell, George R., St. Louis, Mo.
Merrem, Charles D., St. Louis, Mo.

Methudy, Joseph P., St. Louis, Mo.
Meyer, Charles L., Baltimore, Md.
Meyer, Theodore F., St. Louis, Mo.
Milliken, John T., St. Louis, Mo.
Minner, Louis A., Murphysboro, Ill.
Nachtwey, Frank J., Dubuque, Ia.
Naylor, Wm. W., Holton, Kan.
Neville, Wm. R., Austin, Tex.
Noll, Mathias, Atchison, Kan.
Ogier, Wm. R., Columbus, O.
Parmalee, Walter W., Rockland, Me.
* Patten, Eustis, Carbondale, Ill.
Perkins, George H., North Andover Depot, Mass.
Pfeffer, Wm. J., St. Louis, Mo.
Philibert, Leon D., St. Louis, Mo.
Pilkington, W. B., St. Louis, Mo.
Post, Arthur E., Brooklyn, N. Y.
Prutzman, Charles O., Muncie, Ind.
Reilly, Robert C., St. Louis, Mo.
Remington, J. Percy, Brooklyn, N. Y.
Renshaw, Thomas W., Lansford, Pa.
Riley, Cassins M., Alton, Ill.
Riley, Russell, St. Louis, Mo.
Roberts, James F., Parkhill, Can.
Rodemoyer, Wm. E., McKeesport, Pa.
Roesch, Anton, Chicago, Ill.
Rose, Herman L., Columbia, Ill.
Schoenthaler, John P., St. Louis, Mo.
Schreiber, August, Tell City, Ind.
Seitz, Lorenz, A., St. Louis, Mo.
Shendal, Ernest E., Hot Springs, Ark.
Shoults, Robert G., Sonoma, Cal.
Shwab, George A., Nashville, Tenn.
Silverburg, Victor E., Muncie, Ind.
Sloss, Robert A., Sing Sing, N. Y.
Small, Herbert E., Boston, Mass.
Smith, George W., St. Louis, Mo.
Snodgrass, Latta K., Little Rock, Ark.
Spilker, H. F. A., St. Louis, Mo.
Squibb, Charles F., Bernardsville, N. J.
Stegner, Emil, St. Louis, Mo.
Steinmeyer, W. O., Carlinville, Ill.
Stille, A. H., St. Louis, Mo.
Stone, Clarence G., Mt. Vernon, N. Y.
Sturmer, Jnlius W., Lafayette, Ind.
Sultan, Fred'k W., St. Louis, Mo.
Suppiger, Albert E., St. Louis, Mo.
Taber, Joseph M., Elko, Nev.
Temm, Wm. D., St. Louis, Mo.
Tontz, George W., St. Louis, Mo.
Turnquist, Carl M., Chicago, Ill.
Voiss, Arcadius, Chicago, Ill.
Walbridge, Cyrus P., St. Louis, Mo.
Ward, Homer B., Ellisville, Miss.
Weber, Peter J., St. Louis, Mo.
Wendt, William C., Columbus, O.
Wesner, Henry C., Windsor, Mo.
Wisdom, Hugh, Chicago, Ill.
Wolf, Henry A., Las Vegas, N. Mex.
Wolff, Edward H., St. Louis, Mo.
Wright, Charles L., Webb City, Mo.
de Wyl, Fredrica (Miss), Jefferson City, Mo.

* Elected in 1900, but name received too late for publication in the last volume of Proceedings.

LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS, 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics;* under the present By-Laws, in SMALL CAPITALS.]

Abernethy, Maxwell.
BALLARD, JOHN W.
Bartlett, N. Gray.
BAUER, LOUIS G.
Best, John.
BIROTH, HENRY.
BORING, EDWIN M.
CANDIDUS, PHILIP C.
CANNING, HENRY.
CARRELL, EUGENE A.
Colton, James B.
Crossman, George A.
Cummings, Henry T.
Dearborn, George L.
DeForest, W. P.
DIEHL, C. LEWIS.
DOHME, CHAS. E.
DOHME, LOUIS.
Doliber, Thomas.
DRAKE, JOHN R.
DRURY, LINUS D.
EBERT, ALBERT E.
Eckford, Joseph W.
ELLIOTT, HENRY A.
Ellis, Evan T.
EMICH, COLUMBUS V.
FOUGERA, EDMUND C. H.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
GEORGE, CHAS. T.
Goodwin, Wm. W.
Gordon, Wm. J. M.
GROSSKLAUS, JOHN F.
HANCE, EDWARD H.
HANCOCK, JOHN F.
HARLOW, NOAH S.
Harrington, Frank.
Haviland, Henry.
Heintzelman, Joseph A.
Heyl, James B.
HOLMES, CLAY W.
HOLZHAUER, CHARLES.
JACQUES, GEORGE W.
James, F. L.
Jenks, Wm. F.
Jesson, Jacob.
Kent, Robert R.
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
LEE, JAMES A.
LEIS, GEORGE.
LEMBERGER, JOSEPH L.
LEWELLYN, JOHN F.
LLOYD, JOHN URI.
MAIN, THOMAS F.
Mellor, Alfred.
MEYER, CHRISTIAN F. G.
MILHAU, EDWARD L.
MILLER, ADOLPHUS W.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
MOORE, GEORGE.
MOORE, JOACHIM B.
MORRIS, LEMUEL I.
Ollif, James H.
ORNE, JOEL S.
OWENS, RICHARD J.
Patten, I. Bartlett.
Patterson, Theo. H.
Peabody, Wm. H.
Perot, T. Morris.
PETITT, HENRY M.
PORTER, HENRY C.

Power, Frederick B.
Rano, Charles O.
Ramsperger, Gustavus.
Remington, Joseph P.
Rittenhouse, Henry N.
Robinson, James S.
Rollins, John F.
Rumsey, Sam'l L.
Sander, Enno.
Sargent, Ezekiel H.
Saunders, William.
Scheffer, Henry W.
Seabury, George J.
Sharp, Alpheus P.
Sheppard, Samuel A. D.
Shinn, James T.
Simms, Giles G. C.
Sloan, George W.
Snyder, Ambrose G.
Stacey, Benjamin F.
Steele, James G.
Sweeney, Robert O.
Thompson, William B.
Vernor, James.
Viallon, Paul L.
Voiss, Arcadius.
Waugh, George J.
Wellcome, Henry S.
Whelpley, Henry M.
Whitfield, Thomas.
Whitney, Henry M.
Wiegand, Thomas S.
Wilson, Benjamin O.
Winkelmann, John H.
Winter, Jonas.
Woltersdorf, Louis.
Yorston, Matthew M.

Note.—Names of life members whoe residence has been unknown for five consecutive years, are no longer published in the above list, in accordance with the action of the Council approved at the forty-eighth annual meeting. (See Proceedings 1900, p. 18.)

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

Sections Applicable to the American Pharmaceutical Association.

Class 3, Societies, Benevolent, Educational, etc.

Sec. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and object of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

Sec. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

Sec. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

Sec. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

Sec. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said Association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth. The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed: JOHN U. LLOYD, MAURICE W. ALEXANDER, ALEX. K. FINLAY, KARL SIMMON, SAMUEL A. D. SHEPPARD, JOHN M. MAISCH, JAMES VERNOR, C. LEWIS DIEHL, WILLIAM H. ROGERS, WM. SAUNDERS, ALBERT E. EBERT, PHILIP C. CANDIDUS, GEORGE W. KENNEDY, ALBERT H. HOLLISTER, JAMES M. GOOD, LEWIS C. HOPP, WILLIAM DUPONT,

Members of the Council, And JOHN A. MILBURN, G. G. C. SIMMS, E. B. BURY, Z. W. CROMWELL, W. S. THOMPSON, JOHN R. MAJOR, CHARLES CHRISTIANI, W. G. DUCKETT, A. J. SCHAFHIRT, GEO. W. BOYD, O. H. COUMBE, HENRY A. JOHNSTON, GEO. B. LOCKHART, W. C. MILBURN, T. C. MURRAY, ARTHUR NATTANS, JOSEPH R. WALTON, THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAMES M. TROTTER, *Recorder*.

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the interest of which for any current year only may be used by the Association for its expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution. Any proposition to amend the Constitution for the purpose of permitting the expenditure of the permanent invested funds of the Association, shall require a majority of seven-eighths for its passage.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the General Secretary.

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary of $1000, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose, shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1. An introduction or synopsis of the Report to be presented to the Section on Scientific Papers.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of twenty-two members, nine of whom, se-

lected from such members as have had at least three years' membership in this Association, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but *ex-officio* members of the Council shall be eligible for re-election thereto until one year after the expiration of their term of office.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

CHAPTER VII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership: provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing, to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, elect such person a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual dues for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, also any member who shall have paid to the Treasurer annual dues for thirty-seven years, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of

the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER VIII.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, four Sections shall be formed, as follows: 1. Section on Scientific Papers: 2. Section on Commercial Interests: 3. Section on Practical Pharmacy and Dispensing: 4. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth session shall be devoted to the subject of Practical Pharmacy and Dispensing.

ARTICLE VII. The fifth, sixth and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VIII. At the eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE IX. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE X. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE XI. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging

in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XII. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 7. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 8. A committee of five on time and place of meeting shall be appointed by the President at the first session, to report at the second session.

Section 9. Incidental business.

ARTICLE XIII. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the persons nominated shall be balloted for.

Section 4. Reading of the Minutes of the Council.

Section 5. The Council shall present names of persons recommended for membership.

Section 6. Reading of the Reports of the Treasurer and General Secretary.

Section 7. Reports of Standing Committees shall be read.

Section 8. Reports of Special Committees shall be read.

Section 9. Incidental business.

ARTICLE XIV. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XVI. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVII. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER IX.

Of Committees.

ARTICLE I. There shall be appointed or elected eight Standing Committees as follows: a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, a Committee on Practical Pharmacy and Dispensing, and a Committee on Pharmaceutical Legislation and Education, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, each to consist of three members; and a Committee on Transportation, to consist of ten members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person preparing a paper for the Association which will require more than ten minutes for its reading, must accompany the same with a synopsis which can be read within ten minutes' time. The paper and synopsis must both be furnished the Committee of the particular Section to which it refers, previous to the first session.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall, at the next annual meeting after the one at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Practical Pharmacy and Dispensing shall be elected by the Section on Practical Pharmacy and Dispensing. It shall arrange in advance the business to come before the Section at the next annual meeting. It shall propose a series of subjects for general discussion, and solicit papers on subjects pertaining to the actual practice of pharmacy in retail stores.

ARTICLE VIII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating he practice of pharmacy and the sale of medicines. It shall report at each stated meet-.ng of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose

suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE IX. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE X. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

CHAPTER X.

Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $150.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

CHAPTER IV.

Of Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of seven members of the Council, to be elected annually by ballot. The General Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of seven members of the Council, the General Secretary and the Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

SECTION ON COMMERCIAL INTERESTS.

ORDER OF BUSINESS.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Reading of Papers.
5. New Business and Discussion.
6. Nomination and Election of Officers for the ensuing year.
7. Installation of Officers.
8. Reading of the Minutes.
9. Adjournment.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

ORDER OF BUSINESS.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Discussions.
5. Reading of Papers.
6. Nomination and Election of Officers.
7. Installation of Officers.
8. Incidental Business.
9. Reading of the Minutes.
10. Adjournment.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.
4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.
5. Reading of Papers and discussions on the subjects brought up.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous session.
2. Election of Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

SECTION ON EDUCATION AND LEGISLATION.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.
2. Reading of the Address of the Chairman.
3. Report of the Secretary.
4. Reports of Committees.
5. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
6. Reading of Papers and Discussion.
7. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous session.
2. Election of Officers for the ensuing year.
3. Reports of Committees.
4. Reading of Papers and Discussion.
5. New Business.
6. Installation of Officers.
7. Reading of Minutes.
8. Final Adjournment.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895, 1900, 1901.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed by the Council an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council, in the presence of another member of the Association, shall make a list of the numbers and amounts of the bonds belonging to the Association, and both shall make affidavit to such list, which shall then be forwarded to the Auditing Committee for their use in auditing the books of the officers of the Association.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, saving-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council. *Provided*, however, that the Treasurer shall be authorized to transfer from one account to another, such amount as may be needed at any time, the amount of any such transfer not to exceed the sum of fifty (50) dollars.

Fourteenth, Whenever in the judgment of the Finance Committee it shall be necessary, they shall send a written order to the Treasurer, signed by at least two members of said Committee, directing him to use the whole or a portion of the interest of the Life Membership Fund for the current year to defray the expenses of the Association.

Fifteenth, All balances remaining from appropriations at the close of each fiscal year shall be turned back into the treasury, unless otherwise ordered by the Council.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full.....

Number and Street.....

Town and State.....

Recommended by the undersigned two members in good standing:

.....

.....

FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VII., ARTICLE II., OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VII., Article II. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES. ADDRESS.

Proposed by.....

.....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full.....

Date.....

Address.....

.....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc. Pottsville, Penn.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

ENGLAND.

Dr. John Attfield, F. R. S., *Watford*, 1871.
Michael Carteighe, F. I. C., *London*, 1882.
Joseph Ince, F. L. S., *London*, 1882.
Wm. Martindale, F. L. S., F. C. S., *London*, 1898.
E. M. Holmes, F. L. S., *London*, 1899.

GERMANY.

Dr. Edward Schaer, *Strassburg*, 1877.
Dr. Frederick Hoffmann, *Berlin*, 1898.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Ernst Schmidt, Geh. Reg. Rath. *Marburg*, 1899.

INDIA.

David Hooper, F. I. C., F. C. S., *Calcutta*, 1899.

RUSSIA.

Johannes von Martenson, Staatsrath, *St. Petersburg*, 1882.

ACTIVE MEMBERS

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPITALS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Anniston.

Wikle, Jesse Lane 1898

Auburn.

Miller, Emerson Romeo 1895

Mobile.

Brown, Albert Edward 1887
CANDIDUS, PHILIP CHARLES 1857
Punch, William Francis 1874

Montgomery.

Brigham, Laurence Stanton 1898
Knabe, Gustavus Alexander 1876

ARIZONA.

Prescott.

Brisley, Harry 1894

ARKANSAS.

Batesville.

Fletcher, John Wade 1894

Camden.

Morgan, Aylmer Lee 1890

Diamond P. O.

Laird, John 1895

El Dorado.

Appleton, William Riley 1901

Fort Smith.

Sparks, James Mitchell 1894

Helena.

King, Robert Bruce 1901

Hot Springs.

Chesnutt, James H 1901
Klein, Ernest Frederick 1894
Shendal, Ernest Emile 1901

Little Rock.

Bond, John Barnitz 1883
Snodgrass, Latta Kavanaugh 1901

Pine Bluff.

Dewoody, William Lawrence 1887

Pocahontas.

Skinner, William Henry 1894

CALIFORNIA.

Arcata, Humboldt Co.

Bohmansson, Robert Hugo 1901

Benecia Barracks.

Miller, Herman. 1897

Cordelia, Solano Co.

STEELE, JAMES GURDEN 1859

Fullerton.

Kerr, William Whitman 1887

Los Angeles.

Kirkland. Derwentwater 1889

Mare Island.

Hammar, Alrik. 1897

Napa.

Levinson, Joseph 1895

Ontario.

Jesson, Jacob. 1872

San Francisco.

Argenti, Jerome John Baptiste 1893
Barbat, Josephine Eugenia 1900
Bayly, Charles Alfred 1889
Dawson, John Henry 1882
Esters von Krakau, James Henry William 1897
Jackson, William John 1900
Joy, Edwin Wolcott 1882
Moffit, Thomas Sebatier 1861
Pearman, William Edgar 1898
Schmidt, Valentine 1887
Searby, William Martin 1882
Stange, Carl Frederick 1897
Stewart, Francis Edward 1884
Wenzell, Willliam Theodore 1870
White, Richard Edward 1889

Santa Monica.

Devine, John 1887

Sonoma, Sonoma Co.

Shoults, Robert Grafton 1901

Vallejo, Solano Co.

Topley, James 1869

COLORADO.

Boulder.

Ramaley, Francis 1897

Central City.

Best, John 1866
Davies, Llewellyn Powell 1891

Colorado Springs.

Ward, Augustus Jae 1893

Cripple Creek.

Beitenman, William Wallace 1888

Denver.

Depeyre, Louis Noël 1894
Ford, Charles Mangan 1887
Hover, William Adgate 1895
Walbrach, Arthur 1881

Leadville.

Taylor, George Edward 1895

Longmont.

Turrell, Judson Wade 1893

COLUMBIA, DISTRICT OF.

Anacostia.

Weiss, Conrad Henry 1900

Washington.

Boyd, George Washington 1883
Bradbury, Wymond Henry 1895
Criswell, Francis McClure 1892
Duckett, Walter G 1876
Easterday, Herbert Clifton 1893
Elliott, Charles Houston 1899
Ewell, Ervin Edgar 1898
Field, William Carlin 1898
Flemer, Lewis 1895
Franzoni, Joseph Dunbar 1900
Gross, Charles Ernest 1900
Harper, Robert Newton 1900
Henry, Charles Landon 1893
Henry, Frank Clinton 1894
Herbst, William Parker 1895
Hilton, Samuel Louis 1890
Hurlebaus, George William 1895
Hutton, Harry Dubant 1891
Major, John Richards 1873
Martin, John Charles 1883
Milligan, John Dean 1900
Neeley, Guy Minick 1900
Richardson, Willard Stowell 1900
Roe, William Grant 1900
Schafhirt, Adolph Julian 1876
SIMMS, GILES GREEN CRAYCROFT 1860
Stott, Samuel Thompson 1900
Taylor, Augustus Carrier 1900
Waldner, Paul Jacob 1900
Weller, Franklin Pierce 1900

CONNECTICUT.

Bridgeport.

Fisher, Elbert Ellsworth 1892
Leverty, John Augustine 1900

Danbury.

Dickinson, Arthur Lyman 1900

Hartford.

Bennett, James Nixon 1900
Cone, John Wright 1876
Duggan, James 1894
Edwards, Frederick Bulkeley 1894
Ires, Orvin Francis 1900
Kimball, Richard Hitchens 1900
Newton, Philo Woodhouse 1892
Rapelye, Charles Andrew 1876
Seinsoth, John Jacob 1900
Shannon, Thomas Ross Alvin 1892
Stoughton, Dwight George 1890

Tracy, David Wallace 1892
Williams, John Kirby 1875

Jewett City.

Chabot, David Pierre 1895

Meriden.

Mosher, William Wooster 1894

Middletown.

Pitt, John Richard 1872

Naugatuck.

May, James Oscar 1875

New Haven.

Dimock, Robert Hemphill 1889
Gessner, Emil Adolph 1878
Hogan, John Joseph 1890
Lowe, John William 1898
Mix, Willis Lee 1896
Spalding, Warren Alphonso 1876
Sperry, Herman Jay 1880
Wood, Alonzo Felton, Jr. 1890
Wood, James Prior 1890

New London.

Nicholas, John Cutter 1886

Putnam.

Dresser, George Edward 1886

Stamford.

Finch, Charles Smith 1900

Thompsonville, Hartford Co.

Smith, Edward Newton 1885

Waterbury.

Perkins, Charles William 1892
Woodruff, Roderick Samuel 1876

DELAWARE.

Wilmington.

Watson, Herbert Kennedy 1888

FLORIDA.

De Land.

Fisher, George Washington 1893

Jacksonville.

Crum, John Darius 1892
Kirk, James Edgar 1896

St. Augustine.

Smith, Lauriston Stephen 1892
Woodman, Walter Irving 1893

Titusville, Brevard Co.

Dixon, John Marion 1894

Warrington.

Grossjohann, Ernst 1900
Waggener, Richard 1899

GEORGIA.

Atlanta.

Dunwody, Richard Gaillard 1891
Payne, George Frederick 1893
Watson, Sidney Powell 1887

Augusta.

Durban, Sebastian Charles 1883
LAND, ROBERT HENRY 1859

Bowdon.

Lovvorn, James Lewis 1897

Greenville.

Tigner, James Ogletree 1890

Macon.

Brunner, Norman Isaac 1878
Cheatham, Thomas Alexander 1890
King, Campbell Thomas 1897
Lamar, Henry James 1897
Morris, Max 1898
Taylor, Mallory Hunt 1898

Rome.

Curry, David W 1894

Savannah.

Kolb, William Walter 1897
Rowlinski, Robert Antone 1892
Solomons, Isaiah Abram 1894

Summerville.

Arrington, Homer Houston 1892

Thomasville.

Thomas, Robert, Jr. 1888

Waycross.

Paine, Charles Joshua 1899

IDAHO.

Emmett.

Smithson, David Elmer 1890

ILLINOIS.

Alton.

Riley, Cassius Marcellus 1901

Aurora.

Staudt, Louis Carl 1890

Cairo.

Schuh, Paul Gustav 1894

Camp Point, Adams Co.

Bartells, George Case 1881

Carbondale.

Patten, Eustis 1900

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888
Steinmeyer, William Otto 1901

Chicago.

Adamick, Gustave Hattenhauer 1891
Bartlett, Nicholas Gray 1864
Baur, Jacob 1879
Behrens, Emil Christian Louis 1893
Behrens, Paul Johannes Heinrich 1888
BIROTH, HENRY 1865
Bishop, Samuel Edward 1890
Button, Charles Edwin 1881
Conrad, John 1887
Day, William Baker 1895
EBERT, ALBERT ETHELBERT 1864
Fischer, Oscar Frederick 1892
FULLER, OLIVER FRANKLIN 1869
Gale, Edwin Oscar 1857
Gale, Walter Henry 1901
Gale, William Henry 1857
Grassly, Charles William 1884
Gray, Margaret McClintock (Mrs.) 1901
Gray, William 1892
Hall, Mary Stillwell (Mrs.) 1901
Hallberg, Carl Swante Nicanor 1879
Hartwig, Otto Julius 1892
Hereth, Franklin Samuel 1893
Klein, Frederick 1893
Lord, Thomas 1882
Lundberg, John Christian 1892
Matthews, Charles Edwards 1893
McConnell, Charles Henry 1899
McMonies, Thomas Little 1897
Miner, Maurice Ashbel 1880
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Theodore Henry 1869
Pattison, George Henry 1893
Puckner, William August 1888
Rhode, Rudolph Ernst 1887
Roesch, Anton 1901
SARGENT, EZEKIEL HERBERT 1864
Scherer, Andrew 1884
Schmidt, Florian Charles 1882
Schmidt, Frederick Michael 1887
Schmidt, Oscar Weber 1899
Schneider, Albert 1899
Sempill, Walter Morrison 1892
Truax, Charles 1882
Turnquist, Carl Martin 1901
VOISS, ARCADIUS 1901
WHITFIELD, THOMAS 1865
Wisdom, Hugh 1901
WOLTERSDORF, LOUIS 1865
Woods, Charles Henry, Albert 1897
Wooten, Thomas Victor 1893

Chicago Heights.

Michalek, John 1900

Columbia.

Rose, Herman Louis 1901

East St. Louis.

Knoebel, Thomas 1892

Geneseo.

Stamm, Dante Milton 1896

Girard, Macoupin Co.

Deck, Lewis Cass 1901

Highland.

Mueller, Adolphus 1871

Kankakee.

Rogers, Henry Horace 1895

Metropolis.

Humma, Henry John 1900

Moline.

Lindvall, Charles Gustaf 1897
Sohrbeck, George Henry 1888
Sohrbeck, George William 1897

Mount Vernon.

Morse, Edward Worth 1896

Murphysboro.

Minner, Louis Augustus 1901

North Alton.

Barth, George Fred 1896

Pekin.

Ehrlicher, Henry Michael 1892

Peoria.

Benton, Wilbur Merritt 1888
Heschong, John Frederick 1896
Lueder, Fritz 1894
Zimmermann, Albert 1893

Pontiac.

Murphy, John Spence 1896

Stronghurst, Henderson Co.

Harter, Isaac Foster 1893

Waterloo, Monroe Co.

Eilbracht, William Edward 1901

INDIANA.

Albion, Noble Co.

Miller, Chas. Elliott 1899

Columbus.

Otto, Theodor Gotthelf Eduard 1900
Stahlhuth, Ernest Henry William 1887

Evansville.

Schlaepfer, Henry John 1879

Fort Wayne.

Gross, William Otto 1901
Woodworth, Charles Beecher 1900

Indianapolis.

Arnett, William Newton 1901
Carter, Frank Henry 1891
Eads, Robert Isom 1895
Eichrodt, Charles William 1892
Field, Claud 1890
Frauer, Herman Emanuel 1881
Huder, Henry J. 1894
Hurty, John Newell 1882
Lilly, Josiah Kirby 1890
SLOAN, GEORGE WHITE 1857
Waddell, Minor T. 1899
Walter, Charles Albert 1899

Jeffersonville.

Loomis, John Clarence 1876

Lafayette.

Glick, Harry Edwin 1900
Sturmer, Julius William 1901

La Porte.

Meissner, Frederick William, Jr 1890

Muncie.

Prutzman, Charles Oscar 1901
Silverburg, Victor Emanuel 1901

New Albany.

Crecelius, Charles Edgar 1900
Knoefel, Bruno 1896
Knoefel, Charles Deitrick 1894

South Bend.

Eliel, Leo 1882
Meyer, Martin Monroe 1897

Tell City.

Schreiber, Charles Christian Frederic August 1901

Troy.

Gaesser, Theobold Theodore 1901

Warren.

Hickerson, William Henry 1894

IOWA.

Charles City.

Legel, John Gotthelf 1897

Clear Lake.

Etzel, John Leonhardt 1897

Clinton.

Majer, Oscar 1880

Davenport.

BALLARD, JOHN WINTHROP 1871

Des Moines.

Howard, Fletcher 1895
Kinney, Charles Noyes 1901
Macy, Sherman Riley 1891

Dubuque.

Nachtwey, Frank Joseph 1901
Torbert, Willard Horatio 1887
Wittmer, Joseph Washington, Jr 1896

Fort Dodge.

Oleson, Olaf Martin 1887

Fort Madison.

Schafer, George Henry 1871

Iowa City.

Boerner, Emil Louis 1877

Logan, Harrison Co.

Hansen, Hans 1901

Mason City.

Burns, Edwin Miller 1897

Muscatine.

Halstead, Alice Louisa (Mrs.) 1892

Sioux City.

Moore, Silas Harwood 1880
Scherling, Gustav 1884

Stuart.

Treat, Joseph Augustus 1885

Waterloo.

Wangler, Conrad David 1876

Winfield, Henry Co.

Lindly, John Milton 1901

KANSAS.

Argentine.

McGeorge, William 1895

Atchison.

Noll, Mathias 1901

Gypsum City, Saline Co.

Schmitter, Jonathan 1892

Holton, Jackson Co.

Naylor, William W. 1901

Hutchinson.

Ardery, Lorimer 1895

Lawrence.

Havenhill, L. D. 1900
LEIS, GEORGE 1869
Moore, John Thomas 1888
Sayre, Lucius Elmer 1883

Ottawa.

Becker, Charles Lewis 1892

Salina.

Graf, Carl Adolf 1901

Topeka.

Holliday, Francis Emlen 1900

Wilmore.

Sombart, John Edward 1881

KENTUCKY.

Covington.

Pieck, Edward Ludwig 1887
Zwick, Karl George 1899

Flemingsburg.

Reynolds, John Jefferson 1876

Frankfort.

Averill, William Henry 1874
Gayle, John William 1891

Louisville.

Bell, Emil Remigius 1899
Curry, Gordon Laten 1900
DIEHL, CONRAD LEWIS 1863
Dilly, Oscar Charles 1888
Dimmitt, Addison 1895
Edelen, Charles Augustin 1901
Jones, Simon Newton 1870
Newman, George Abner 1866
O'Gorman, Theophilus Vincent 1897
Peter, Minor Cary 1894
Schiemann, Edward Bernard 1880
Schoettlin, Albert John 1882
Troxler, Constantine, Jr. 1896
Votteler, William 1895

Shelbyville.

Preissler, Henry Webber 1893

Somerset.

Porter, Chilton Scott 1882

LOUISIANA.

Bayou Goula.

Viallon, Paul Louis 1870

New Iberia.

LEE, JAMES AUGUSTIN 1856

New Orleans.

Brown, George Stewart 1900
Finlay, Alexander Kirkwood 1883
Godbold, Fabius Chapman 1887
Grambois, Augustin 1891
Keppler, Christian Lewis 1882
Legendre, Joseph Amilcar 1891
Levy, William Michael 1894
Lyons, Isaac Luria 1875
Metz, Abraham Lewis 1887
Otto, John Nicholas Washington 1891
Samson, Max 1900
Taylor, Walter Thomas 1891
Wunderlich, Edward 1891

Plaquemine.

Hiriart, Sebastian 1891

MAINE.

Augusta.

Partridge, Charles Kimball 1867
Partridge, Frank Reuben 1895

Bangor.

HARLOW, NOAH SPARHAWK 1859
Sweet, Caldwell 1881

Bath.

Anderson, Samuel 1876

Biddeford.

Boynton, Herschel 1875

Boothbay Harbor.

McClearn, Henry Trefethen 1896

Kittery.

Trefethen, Frederick James 1899

Lewiston.

Lowell, Edward Mark 1896

Machias.

Crane, Frank Trussell 1894

Orono.

Jackman, Wilbur Fisk 1899

Portland.

Broe, James Augustine 1898
Drew, Walter Israel 1896
Frye, George Carlton 1879
Hay, Edward Allston 1889
Perkins, Benjamin Abbott 1878
Schlotterbeck, Augustus George 1896

Rockland.

Parmalee, Walter Woodruff 1901

Saco.

Sawyer, Charles Henry 1896

South Windham.

Rand, Daniel Moulton 1892

Waterville.

Dorr, George Watson 1896

MARYLAND.

Annapolis.

Pearson, Joseph Frederick 1897

Baltimore.

Appleby, Samuel Norwood 1899
Barnett, Joel Jones 1899
Base, Daniel 1898
Baughman, John Henry 1899
Beck, John Godlove 1899
Brack, Charles Emil 1876
Brickman, Arthur Otto 1898
Burrough, Horace 1883
Burrough, Horace, Jr. 1901
Caspari, Chas., Jr 1883
Caspari, William, Jr 1898
Corning, Albion James 1898
Culbreth, David Marvel Reynolds 1883
Davis, John Alexander 1894
Dohme, Alfred Robert Louis 1891
DOHME, CHARLES EMILE 1863
Dohme, Charles Louis 1899
DOHME, LOUIS 1859
ELLIOTT, HENRY ALEXANDER 1859
EMICH, COLUMBUS VALENTINE 1863
Feick, Charles 1901
Fouch, William M 1898
Frames, John Fuller 1890
Gilpin, Henry Brooke 1889
HANCOCK, JOHN FRANCIS 1863
Hengst, J. Edwin 1900
Hynson, Henry Parr 1890
Kornmann, Henry 1899
Maisch, Henry 1898
Mansfield, Samuel 1898
Meyer, Charles Louis 1901
Millard, David Rockwell 1899
Muth, George Louis 1894
Muth, John Clement 1898
Muth, John Sebastian 1898
Nattans, Arthur 1883
Neal, Charles Chaplin 1899
Nordmann, Herman 1895
Pilson, Abram Owen 1898
Quandt, Arthur Albert 1894
Quandt, Ernest Edmund 1894
Richardson, Thomas Leonard 1895
Schrader, August Christian 1898
Schulze, Louis 1892
Sharp, Alpheus Phineas 1855
Simon, William 1885
Smith, Theodric 1890
Streett, Edmund Oldfield 1898
Stuart, William Alexander 1898
Thomas, John Benjamin 1898
Thompson, Albert Eccleston 1898
Ware, Charles Howard 1898
Westcott, James Walling 1890
Wiesel, John Martin 1898
Williamson, Robert Edward Lee 1898
Winkelmann, Henry Christian 1898
WINKELMANN, JOHN HENRY 1864

Hagerstown.

Aughinbaugh, David Culbertson 1898
Meredith, Harry Lionel 1900
Mumma, Daniel Edgar 1897
Walts, Charles Conley 1898
WINTER, JONAS 1863

Lonaconing.

Campbell, George Dowery 1900

Snow Hill.

Powell, William Cottingham 1895

Taneytown.

McKinney, Robert Sentman 1898

MASSACHUSETTS.

Boston.

Baird, Julian William 1894
Bassett, Charles Harrison 1867
Boyden, Edward Cleveland 1874
Burnham, Alfred Augustus, Jr 1891
Burwell, Arthur Cyril 1899
CANNING, HENRY 1865
Capper, William Ernest 1892
Colton, James Byers 1865
Cramer, Max 1881
Day, Edward John 1901
Dolbier, Thomas 1859
DRURY, LINUS DANA 1871
Durkee, William Carley 1885
Ewing, Mary Steele 1898
French, John Innes 1894
Gammon, Irving Parker 1891
Gedding, John Granville 1875
Hayes, James Henry 1892
Jones, James Taber 1875
Lauricella, Felice 1896
Lewis, Ernest Grant 1892
Lowd, John Colby 1871
Markoe, George Burger 1897
Patton, Ichabod Bartlett 1858
Pfaff, Franz 1899
Pierce, William Herbert 1879
Sawyer, William Frederick 1885
Scoville, Wilbur Lincoln 1891
Sharpless, Stephen Paschell 1875
SHEPPARD, SAMUEL AIRUS DARLINGTON. 1865
Small, Herbert Elwyn 1901
Smith, Linville Holton 1892
Stowell, Daniel 1875
Tilden, Amos Kendall 1892
Tucker, Greenleaf Robinson 1890
Vargas-Heredia, Jorge 1891
Varney, Edward Francis 1892
Wells, Edwin Herbert 1893
West, Charles Alfred 1892
Wheeler, William Dexter 1892
Williams, George Gorham 1888
WILSON, BENJAMIN OSGOOD 1859
Wood, Edward Stickney 1879

Brocton.

Randall, Frank Otis 1893

Cambridge.

Claflin, Walter Addison 1896
Lynch, Frank Kernan 1897
Phillips, Carrie Elizabeth 1894

Cambridgeport.

La Pierre, Elie Henry 1892
Norton, George Edward 1895
ORNE, JOEL STONE 1859

Charlestown.

Cowan, John 1897
Marshall, Ernest Clifton 1875
STACEY, BENJAMIN FRANKLIN. 1860

Chelsea.

Buck, John Lynian 1883

Concord.

Richardson, Horatio Stillman 1892

Fall River.

Riddell, Benjamin Franklin 1892

Fitchburg.

Estabrook, Henry Arthur 1886

Holyoke.

Ball, Charles Ely 1885

Jamaica Plain.

Ernst, Frank Frederick 1891

Lawrence.

Glover, William Henry 1891

Lee.

Pease, Francis Merrick 1880

Leominster.

Nixon, Charles Frederic 1900

Lowell.

Bailey, Frederick 1869

Butler, Freeman Hall.....1874
Hood, Charles Ira.....1871
Robinson, Edward Augustus.....1888
Thomasson, Anders.....1892

Malden.

Keaney, James John.....1899

Marlborough.

Hartshorn, Frederick Arthur.....1880

Melrose.

Larrabee, John.....1897

New Bedford.

Blake, James Edwin.....1866
Shurtleff, Israel Hammond.....1875

Newburyport.

Davis, Charles Leland.....1897
Goodwin, William Wells.....1853

Newton.

Crowdle, John Edward.....1894
Hudson, Arthur.....1882

North Andover.

Murphy, John P.....1900

North Andover Depot.

Perkins, George Henry.....1901
WHITNEY, HENRY MARTIN.....1859

Pittsfield.

Hydren, Carl.....1892

Raynham.

Crossman, George Alvin.....1872

Salem.

Nichols, Thomas Boyden.....1876
Price, Charles Henry.....1882
Price, Joseph.....1888

Shelbourne Falls.

Baker, Edwin.....1875

Stoneham.

Drake, Frederick Townsley.....1894
Patch, Edgar Leonard.....1872
Ward, Charles Abraham.....1891

Worcester.

Guerin, James Francis.....1898
Harris, Francis Mason.....1894
Scott, George Theodore.....1883

MICHIGAN.

Ann Arbor.

Eberbach, Ottmar.....1869
Prescott, Albert Benjamin.....1871
Schlotterbeck, Julius Otto.....1888
Schumacher, Albert Christian.....1900
Stevens, Alviso Burdette.....1885

Corunna.

Reidy, Michael.....1894

Detroit.

Doty, Wirt Payson.....1900
Hall, William Alanson.....1888
Helfman, Joseph.....1894
Houghton, Elijah Mark.....1899
Knox, James Wesley Thompson.....1898
Lyons, Albert Byron.....1885
Mason, Harry Beckwith.....1896
Perry, Frederick William Riley.....1885
Ryan, Frank Gibbs.....1892
Seltzer, Leonard Adams.....1899
Sherrard, Charles Cornell.....1893
Stearns, Frederick.....1897
Vernor, James.....1866
Warren, William Matthew.....1889

Flushing.

Sprague, Wesson Gage.....1895

Ionia.

Gundrum, George.....1882

Kalamazoo.

McDonald, George.....1871
Todd, Albert May.....1885

Saginaw.

Heim, Henry.....1900

MINNESOTA.

Duluth.

Abbett, William Allen.....1901
LeRicheux, Alfred Charles.....1901
Sweeney, Robert Ormsby.....1866

Jasper.

Johnson, Louise Loretto (Mrs.).....1898

Minneapolis.

Allen, E. Floyd.....1885
Danek, John Francis.....1895
Gamble, Stewart.....1897
Huhn, George.....1884

King, George Alexander Newton 1892
Rauch, Henry.....1897
Thompson, Albert Delano 1895
Wanous, Josephine Anna 1897
Wittich, Matthew Henry.....1897
Wulling, Frederick John..... ...1893

New Ulm.

Eckstein, Andrew Joseph..... 1895

Ortonville.

Nielson, John.....1897

Pelican Rapids, Otter Tail Co.

Axness, Ole Mikkelson.....1895

St. Louis Park.

Fink, Frederick William.....1886

St. Paul.

Collier, William Kelly.....1897
Frost, William Arthur 1892
Heller, Charles Tompkins.....1895
Zimmermann, Bernard 1895

Warren.

Whitney, Edgar Francis 1897

Willmar.

Carlson, Swan B.....1897

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William.....1883

Ellisville.

Ward, Homer Benjamin.....1901

Indianola.

Craig, William Preston.....1901

Jackson.

Hart, Joseph 1901

Meridian.

Moore, Joshua Forrest 1891

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

Boonville.

Mittelbach, William 1891

Bunceton, Cooper Co.

Kerns, William Bolton 1901

Carrollton.

Knight, William Christian 1900
PETTIT, HENRY MCEWEN.....1860

Centralia.

Hope, Robert Lee.....1901

Excello, Macon Co.

Powell, William David 1898

Jefferson City.

Brandenberger, Adolph.....1894
de Wyl, Fredrica 1901

Kansas City.

Breunert, August 1901
Crampton, Ferd Leslie 1896
Eyssell, George.....1889
Federmann, William Martin 1901
Griffiths, Joseph..... 1901
Hess, Paul Ludwig 1892
Krueger, Owen William 1897
Mente, Alvin William 1901

Kirkwood.

Hemm, Louis Phillips.....1894

Lebanon.

Farrar, Samuel Richard 1891

Mexico, Audrian Co.

LLEWELLYN, JOHN FREDERICK 1867

Nevada.

Ballagh, Wilfred Thomas 1901

New Madrid.

Hummel, John Andrew.....1901

Plattsburg.

Bowen, Cyrus West..... 1901

Sedalia.

Bard, William Evans.....1901

St. Joseph.

Clark, James Ryland 1895

St. Louis.

Ameling, Frank Henry.....1901
Bartmer, Adolph Henry 1901
Batt, Bruno 1901
Berryman, William Ellis 1901
Blank, Alois 1881
Boehm, Solomon 1871
Claus, Otto Ferdinand.....1901

Duering, Henry Charles 1901
Elbrecht, Oscar Herman 1901
Euler, Frederick Christopher 1901
Falk, John Charles 1900
Fischer, John Frederick Henry 1901
Frerichs, Frederick William 1901
Fricke, Frederick Henry 1901
Friedewald, Hermann Wolfgang 1901
Funsch, Oliver John 1901
Good, James Michener 1871
Grewe, Louis Frederick 1901
Haffner, Jean Charles 1901
Hagee, William Price 1901
Hagenow, Theodore Frederick 1901
Hahn, Charles William John Henry .. 1901
Hassebrock, Henry Fred 1884
Heinrich, Max Paul 1901
Hemm, Francis 1881
Hinrichs, Carl Gustav 1901
Hinrichs, Gustavus Detlef 1895
Hinton, Rufus Gray 1901
Ilhardt, William Kellermann 1901
Judge, Charles Rogers 1901
Kaltwasser, August Philip 1901
Klie, George Henry Charles 1878
Koeneke, Charles Henry 1901
Lamar, William Robinson 1901
Layton, Thomas 1892
Mallinckrodt, Edward 1869
May, Charles Charlotte 1898
Merrell, George Robert 1901
Merrem, Charles Daniel 1901
Methudy, Joseph Peter 1901
Meyer, Christian Fried. Gottlieb. 1860
Meyer, Theodore Frederick 1901
Milliken, John Thomas 1901
Noll, Martin James 1898
Pauley, Frank Charles 1879
Pfeffer, William Joseph 1901
Philibert, Leon David 1901
Pilkington, William Bouldin 1901
Reilly, Robert Charles 1901
Richardson, Samuel William 1897
Riley, Russell 1901
Sander, Enno 1858
Scheffer, Henry William 1863
Schoenthaler, John Paul 1901
Schurk, Louis 1890
Seitz, Lorenz Aloysius 1901
Sennewald, Emil August 1900
Smith, George Wallace 1901
Spilker, Hermann Frederick Albert .. 1901
Stegner, Emil 1901
Stille, Adolph Herman 1901
Sultan, Frederick William 1901
Suppiger, Albert Eugene 1901
Temm, William Daniel 1901
Tontz, George Washington 1901
Uhlich, Ferdinand Gottlieb 1881
Vitt, Rudolph Simon 1895
Vordick, August Henry 1874
Walbridge, Cyrus Packard 1901
Wall, Otto Augustus 1884
Weber, Peter John 1901
Whelpley, Henry Milton 1887
Whitcomb, Frederick Ezekiel 1888
Wolf, Henry Adam 1901
Wolff, Edward Henry 1901
Wurmb, Theodore Henry 1890

Webb City.

Wright, Charles Lewis 1901

Webster Groves, St. Louis Co.

Meisburger, William Joseph 1900
Mueller, Ambrose 1894

Windsor, Henry Co.

Wesner, Henry Clay 1901

MONTANA.

Butte.

Rockefeller, Howard 1900

NEBRASKA.

Fairbury.

Pease, Autumn Vine 1893

Grand Island, Hall Co.

Buchheit, Augustus William 1893

Lincoln.

Barth, Henry H. 1901

Omaha.

Mares, Ferdinand Louis 1897
Myers, Preston B 1897
Schmidt, Joseph H 1897
Sherman, Charles Rollin 1889

NEVADA.

Elko.

Taber, Joseph Milo 1901

Winnemucca.

Brown, William Ambrose 1893

NEW HAMPSHIRE.

Derry Depot.

Bell, Samuel Howard 1890

Dover.

Rollins, John Francis 1859

Littleton.

Robins, Wilbur Fiske 1892

New Market.

Dearborn, George Luther 1853

Portsmouth.

Grace, William Day 1896
Green, Benjamin 1888
Preston, Andrew Peabody 1881

Somersworth.

Hurd, John Charles 1892
MOORE, GEORGE 1859

NEW JERSEY.

Atlantic City.

Wescott, William Carter 1896

Bayonne.

Alpers, William Henry 1898

Bernardsville.

Squibb, Charles Fellows 1901

Bordentown.

Carslake, George Middleton 1880

Bridgeton.

Dare, Charles Ford 1889

Camden.

Beringer, George Mahlon 1893

Chatham.

Dougherty, Samuel Edward 1875

East Orange.

Davis, William Mortimer 1879
Williams, Seward Whiting 1887

Elizabeth.

Frohwein, Richard 1867
Kent, Henry Avery, Jr. 1880
Oliver, William Murray 1875

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, John Putnam 1881

Hoboken.

KLUSSMANN, HERMANN 1876

Jersey City.

Abernethy, Maxwell 1865
Foulke, James 1881
Gallagher, John Charles 1893
Lyons, Fred. Wyckoff 1893
Vockroth, Emil 1893
White, George Henderson 1868

Keyport.

Warn, William Edgar 1886

Lakewood, Ocean Co.

Harrison, William John 1896

Madison.

Brown, William Thompson 1894

Matawan, Monmouth Co.

Slater, Frank Hovey 1882

Medford.

Thorn, Henry Prickett 1879

Morristown.

CARRELL, EUGENE AYRES 1875

Newark.

Betzler, Jacob 1880
Foster, John Benjamin 1901
HOLZHAUER, CHARLES 1873
Menk, Charles William 1898
Sayre, William Henry 1877
Smith, Charles Bradley 1868
Smith, Clarence Pennington 1890
Staehle, Louis Lorenz 1898
Stamford, William Harrison 1876
Van Winkle, Abraham 1871
Wuensch, Charles 1898

New Brunswick.

Kilmer, Frederick Barnett 1886

Perth Amboy.

Parisen, George Warren 1892

Phillipsburg.

Anewalt, Ellsworth Quincy 1901

Plainfield.

Ollif, James Henry 1867

Riverside.

Pine, Warren Carleton 1897

South Amboy.

Jacques, George Washington 1869

NEW MEXICO.

East Las Vegas.

Portmann, Cæsar Augustus 1897

Fort Stanton.

Maguire, Eduord Sylvester 1897

NEW YORK.

Albany.

Bradley, Theodore James 1896
Gaus, Charles Henry 1879
Huested, Alfred Birch 1879
Michaelis, Gustavus 1882
Turner, George Heather 1880
Walker, William John 1880

Brooklyn.

Anderson, William Christine 1900
Bartley, Elias Hudson 1893
Brooks, George Washington 1879
Brundage, Albert Harrison 1892
Colen, James Austin 1892
DeForest, William Pendleton 1879
DeJonge, Cornelius 1899
Dennin, Charles 1875
Dennin, Edwin Clinton 1892
Dewender, William Henry 1896
Douglass, Henry 1875
Dunn, John Augustus 1867
Eccles, Robert Gibson 1885
Englander, Samuel 1899
Fougera, Edmund Charles Henry 1890
Haviland, Henry 1857
Krieger, Philip 1876
Levy, Adolph 1877
McElhenie, Thomas DeArmond 1872
McMahon, Joseph 1897
Owens, Richard John 1860
Post, Arthur Edward 1901
Ray, Peter William 1892
Remington, Joseph Percy 1901
Rosenzweig, Benjamin 1898
Snyder, Ambrose Chancellor 1867
Squibb, Edward Hamilton 1882
Topping, Charles Orlando 1899
Tuthill, Frederic Percival 1899
Webber, Joseph LeRoy 1886
Werner, Rudolph Carl 1892

Buffalo.

Gregory, Willis George 1886
Hayes, Horace Phillips 1880
Lockie, James Alexander 1896
Peabody, William Huntington 1857
Rano, Charles Orlando 1866
Stoddart, Thomas 1900

Catskill.

Du Bois, William Laneman 1880

Corning.

Cole, Victor Le Roy 1890

Croton-on-Hudson.

Henry, Charles (Dworniczak) 1881

Dunkirk.

Davis, Eugene Miller 1892

Elmira.

Holmes, Clayton Wood 1873

Fillmore, Allegany Co.

Ridgway, Lemuel Augustus 1882

Fishkill-on-Hudson.

Moith, Augustus Theodore 1860

Flushing.

Hepburn, John 1873

Geneseo, Livingston Co.

Rogers, Arthur Henry 1882

Groton.

Rhodes, Charles Orman 1895

Jamaica, Queens Co.

Baylis, Lewis Fosdick 1880
Goodale, Harvey Galusha 1879
Peck, George Lyman 1883

Kingston.

Bunker, Elihu 1885

Middletown.

King, James Theodore 1859
Rogers, William Henry 1869

Mount Vernon.

Blackmore, Henry Spencer 1896
Gill, George 1872

Rauschenberg, Sidney.....1900
Stone, Clarence George.....1901

Newburg.

Chapman, Isaac Close.....1887

New York City.

Allison, William Outis.....1895
Alpers, William Charles.....1890
Amend, Bernard Gottwald.....1892
Amend, Otto Paul.....1892
Aquaro, Joseph.....1900
Balser, Gustavus.....1875
Bigelow, Clarence Otis.....1900
Billings, Henry Merry.....1869
Boeddiker, Otto.....1895
Chandler, Charles Frederic.....1867
Coblentz, Virgil.....1882
Cook, Thomas Penrose.....1877
Daggett, Volney Chapin.....1901
Diekman, George Charles.....1898
Erb, Charles Stephan.....1898
Ewing, John.....1893
Faber, Walter Eberhard.....1900
Fairchild, Benjamin Thomas.....1875
Fairchild, Samuel William.....1887
Fraser, Horatio Nelson.....1888
Gane, Eustace Harold.....1895
Gardner, Robert Winslow.....1867
Geisler, Joseph Frank.....1889
Goldmann, Oscar.....1900
Gregorius, George Gustavus Chas. Wm. 1898
Hauenstein, William.....1883
Haynes, David Oliphant.....1887
Heydenreich, Emile.....1867
Hirseman, Felix.....1900
Hopkins, Jesse L.....1898
Hudnut, Richard Alexander.....1899
Jelliffe, Smith Ely.....1895
Jungmann, Julius.....1879
Kalish, Julius.....1875
Kalish, Oscar G.....1900
Keenan, Thomas John.....1894
Kennedy, Ezra Joseph.....1887
Kent, Robert Restieaux.....1855
Kirchgasser, William Charles.....1888
Lampa, Robert Raymond.....1892
Lovis, Henry Christian.....1892
MAIN, THOMAS FRANCIS.....1872
Mayo, Caswell Armstrong.....1893
McIntyre, Byron Floyd.....1876
McIntyre, Ewen.....1873
McKesson, George Clinton.....1888
McKesson, John Jr.....1867
MILHAU, EDWARD LEON.....1858
Molwitz, Ernest.....1867
Murray, Benjamin Lindley.....1896
O'Neil, Henry Maurice.....1879
Parsons, Charles West.....1899
Plaut, Albert.....1894
Quackinbush, Benjamin Franklin.....1886
RAMSPERGER, GUSTAVUS.....1860
Reynolds, Charles Edward.....1897
Runyon, Edward Wheelock.....1875
Rusby, Henry Hurd.....1890
Sayre, Edward Augustus.....1877
Schieffelin, William J.....1892
Schimpf, Henry William.....1894
Schmid, Henry.....1887
Schmidt, Ferdinand Traugott.....1886
SEABURY, GEORGE JOHN.....1876
Sieker, Ferdinand August.....1893
Skelly, James Joseph.....1866
Smith, Reuben Randolph.....1890
Takamine, Jokichi.....1898
Tsheppe, Adolph.....1876
Wichelns, Frederick.....1881
Wickham, William Hull.....1870
Wilson, William.....1876

Oswego.

Butler, Charles Henry.....1887

Plattsburg.

Hitchcock, John E.....1892

Port Henry.

Smith, Edward Salvister.....1890

Richfield Springs.

Smith, Willard Alfred.....1880

Saratoga Springs.

Fish, Charles Frederick.....1866

Sing Sing.

Sloss, Robert Audley.....1901

Stapleton, Staten Island.

Miller, Charles.....1897

Syracuse.

Dawson, Edward Seymour, Jr.....1876
Muench, William.....1899
Snow, Charles Wesley.....1876

Utica.

Blaikie, William.....1879

Wellsville, Allegany Co.

Hall, Edwin Bradford.....1879

Yonkers.

Petsche, Franz Fried. Bismarck Wilhelm. 1892

NORTH CAROLINA.

Asheville.

Pfafflin, Henry Adolph.....1892
Smith, Whitefoord Gamewell.....1892

Chapel Hill.

Howell, Edward Vernon.....1900

Charlotte.

Walker, Thomas Arthur.....1900
Wearn, Wiiliam Henry.....1888

Concord.

Johnson, Daniel Dudley.....1894

Durham, Orange Co.

Vaughan, Parry Wyche.....1882

Raleigh.

Bobbitt, James Henry.....1894
Hicks, Henry Thomas.....1898
Simpson, William.....1873

Scotland Neck.

Whitehead, Eugene Thomas.....1900

Tarboro.

Macnair, Whitmel Horne.....1898
Zoeller, Edward Victor.....1878

Wilmington.

Hardin, John Haywood.....1881

NORTH DAKOTA.

Jamestown.

White, Herbert Eugene.....1897

Lakota.

St. John, Sydney Sylvester.....1897

OHIO.

Arcanum.

Johnson, Joseph Henry.....1899

Cambridge.

Ogier, John Morrison.....1895

Canton.

Roth, Charles Robert.....1900

Chillicothe.

Howson, Arthur Bayshawe.....1886
Nipgen, John Alvin.....1879

Cincinnati.

Cone, Earl Hobart.....1901
DeLang, Alfred.....1887
Fennel, Charles Theodore Piderit.....1886
Fieber, Gustavus Adolphus.....1893
Gordin, Harry Mann.....1899
Gordon, William John Maclester.....1854
Greyer, Julius.....1880
LLOYD, JOHN URI.....1870
Merrell, Charles George.....1888
Merrell, George.....1879
Ruppert, John.....1880
Serodino, Herman.....1880
Simonson, William.....1887
Wagner, Henry.....1876
Wetterstroem, Albert Frederick Charles. 1888
Wetterstroem, Theodore David.....1897
YORSTON, MATTHEW MACKAY.....1864
Zuenkeler, John Ferdinand.....1887

Cleveland.

Arny, Harry Vin.....1891
Benfield. Charles William.....1893
Bruce, James.....1882
Cobb, Robert Lathrop.....1883
Feil, Joseph.....1885
Gleim, John Christopher.....1893
Haake, William Henry.....1893
Hannan, Owen Burdette.....1893
Hechler, George Lewis.....1882
Hopp, Lewis Christopher.....1876
Krause, John.....1900
Kuder, William Frank.....1893
Lehr, Philip.....1885
Myers, Daniel.....1882
Schellentrager, Ernst August.....1882
Schoenhut, Christian Henry.....1888
Selzer, Eugene Reinhold.....1893
Sherwood, Henry Jackson.....1894
Sords, Thomas Vincent.....1893
Urban, Jacob Philip.....1881
Voss, George William.....1885

Columbiana.

Ink, Charles Elliott.....1885

Columbus.

Bruck, Philip Henry.....1884
Byrne, John.....1893
Dye, Clair Albert.....1901

Hatton, Edgar Melville 1878
Hatton, Ellmore Wright 1894
Huston, Charles 1872
Kaemmerer, William Frederick 1899
Kauffman, George Beecher 1882
Matson, George Hiram, Jr. 1869
Ogier, William Robert 1901
Rauschkolb, John 1894
Schueller, Frederick William 1880
Wendt, William Carl 1901

Conneaut, Ashtabula Co.

Symonds, Arthur Henry 1892

Dayton.

Burkhardt, Mark Anthony 1887
Latin, George 1900

Delphos.

King, Ferdinand Henry 1901

East Liverpool.

Bulger, Alvin Harry 1899

Findlay.

Firmin, John Curtis 1893

Grand Rapids, Wood Co.

Thurston, Azor 1886

Logan.

Harrington, Frank 1869

Middletown.

Johnson, Charles Brayton 1876

Navarre.

Grossklaus, John Ferdinand 1859

New Philadelphia.

Miller, William Harvey 1898

Scio.

Beal, James Hartley 1892

Springfield.

Casper, Thomas Jefferson 1867
Siegenthaler, Harvey Newton 1882

Wooster.

Ohliger, Lewis Philip 1871

Youngstown.

Cassaday, Orlin Ulysses 1899

OKLAHOMA TERRITORY.

Guthrie.

Lillie, Foress Ball 1900

Hennessey.

Dinkler, Frank A 1900

McLoud.

Golden, Lee Hampton 1900

Oklahoma City.

Weaver, Francis Marion 1900

OREGON.

Portland.

Blumauer, Louis 1889
Robertson, Felix Otey 1890

The Dalles.

Blakeley, George Clarence 1892

PENNSYLVANIA.

Allegheny City.

Einstein, Morris 1900
Gleghorn, James Seymour 1900
Johnson, Ralph Henry 1901

Beaver, Beaver Co.

Andriessen, Hugo 1875

Braddock.

Hollander, Joseph Maurice 1901

Butler.

Boyd, Charles Newton 1900

Carlisle.

Horn, Wilbur Fisk 1876

Chambersburg.

Keefer, Charles DeWalt 1891

Connellsville.

Berryhill, Henry Pennick 1890

Du Bois.

Hay, Charles La Mar 1898

Girardville.

Donaghue. James 1900
Donaghue, Theresa Veronica 1900

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert 1884
Gross, Edward Ziegler 1883
Miller, Jacob Augustus 1873
Smith, Benjamin Franklin 1892

Haverford.

Harbaugh. Wilson Linn 1896

Huntingdon Valley, Montgomery Co.

Robinson, Ernest Frankish 1889

Johnstown.

Griffith, Charles 1900

Lancaster.

Heinitsh, Sigmund William 1889

Langhorne.

Hancock, Charles West 1868

Lansford, Carbon Co.

Renshaw, Thomas Worthington 1901

League Island.

Scott, Theodore William 1899

Lebanon.

LEMBERGER, JOSEPH LYON 1858
Redsecker, Jacob Henry 1881

McKeesport.

Rodemoyer, William Edward 1901

Mount Joy, Lancaster Co.

Garber, Elmer Franklin Weaver 1901

Norristown.

Reed, Willoughby Henry 1893

Philadelphia.

Bamford, Melvin William 1901
BAUER, LOUIS GUSTAVUS 1867
Bohn, Charles Henry 1897
Borell, Henry Augustus 1874
BORING, EDWARD MCCURDY 1867
Burg, John Dellinger 1888
Cliffe, William Lincoln 1898
Cook, Ernest Fullerton 1901
Dobbins, Edwards Tompkins 1867
Eddy, Henry Clay 1869
Ellis, Evan Tyson 1857
England, Joseph Winters 1893
Feidt, George David 1898
Fox, Peter Paul 1869
French, Harry Banks 1890
Gano, William Hubbell 1892
Gordon, Frederick Troup 1900
Guise, P. Nettleton 1897
HANCE, EDWARD HANCE 1857
Hassinger, Samuel Ellphat Reed 1880
Haussmann, Frederick William 1895
Heintzelman, Joseph Augustus 1858
Hoch, Aquila 1896
Jenks, William Jenks 1858
Jones, Alexander Henry 1874
Kebler, Lyman Frederic 1894
Keeney, Caleb Reynolds 1868
Kline, Mahlon Norwood 1878
Koch, Lewis 1872
Kraemer, Henry 1892
Krewson, William Egbert 1875
LaWall, Charles Herbert 1896
Lincoln, George Washington 1899
Lowe, Clement Belton 1895
Matusow, Harry 1897
McIntyre, William 1868
Mellor, Alfred 1864
MILLER, ADOLPH WILLIAM 1868
Milligan, Decatur 1867
Moerk, Frank Xavier 1898
MOORE, JOACHIM BONAPARTE 1860
Morison, John Louis Dales 1895
MORRIS, LEMUEL IORWERTH 1880
Mulford, Henry Kendall 1896
Ottinger, James Jeremiah 1876
Peacock, Bertha Leon (Mrs.) 1895
Peacock, Josiah Comegys 1892
Perot, Thomas Morris 1857
Pile, Gustavus 1881
Potts, David Gardiner 1893
Procter, Wallace 1874
REMINGTON, JOSEPH PRICE 1867
Rittenhouse, Henry Norman 1857
Sadtler, Samuel Philip 1893
Shafer, Erwin Clement 1893
SHINN, JAMES THORNTON 1860
Shoemaker, Richard Martin 1869
Stedem, Laurence Sylvester Aloysious 1900
Stroup, Freeman Preston 1900
Thompson, William Beatty 1858
Webb, William Henry 1867
Weidemann, Charles Alexander 1868
Wendel, Henry Edward 1873
Wiegand, Thomas Snowden 1857

Pittsburgh.

Emanuel Louis 1878
Henderson, Archibald Keys 1888
Judd, Albert Floyd 1901
Koch, Julius Arnold 1892
Lohmeyer, Henry Louis 1900
Schaeffer, Emil August 1900

Pottstown.

Byers, Huizinga Clarance 1900

Pottsville.

Diebert, Thomas Irvin.....1882
Kennedy, George Washington 1869

Reading.

Ziegler, Philip Milton.....1867

Scranton.

Thomas. Daniel Judson. 1900

Sharpsburg.

Patrick, Elmer Alcorn.....1900

Towanda.

PORTER, HENRY CARROLL.....1872

West Chester.

Evans, Joseph Spragg 1877

Williamsport.

Cornell, Edward Augustus.....1873
Duble, Jesse Balderston.....1870

York.

Alexander, Charles Ellis..... ..1899
Patton, John Franklin 1880

RHODE ISLAND.

Narragansett Pier.

Tobin, John Martin 1887

Newport.

Downing, Benjamin Franklin, Jr 1886
Wood, John William.....1897

Providence.

Blanding, William Oliver 1894
Greene, William Ray 1883
Lyon, George Calvin 1899
O'Hare, James.....1888
Pearce, Howard Anthony 1894
Potter, William Robert 1894
Wood, Mason Bowen.....1882

Westerly.

Collins, Albert Burlingame 1882

Woonsocket.

Jackson, Frank Anthony 1900
Simmons, Frank Birtles.....1897

SOUTH CAROLINA.

Anderson.

Ligon, John Temple.....1900

Camden.

Zemp, William Robinson 1900

Charleston.

Aimar, Charles Pons.....1879

Columbia.

Thomas Oscar Ernest.....1882

Greenville.

Carpenter, Alfred Baxter.....1898

SOUTH DAKOTA.

Wakonda.

Gilchrist, Nellis Remer.....1901

Watertown.

Jones, David Franklin 1895

Yankton.

Brecht, Frederick Adolph.....1895

TENNESSEE.

Chattanooga.

Greve, Charles Mathias 1887
Voigt, Joseph Frederick.....1893

Clarksville.

Lockert, Charles Lacy 1894

Columbia.

Rains, Aris Brown.....1894

Humboldt.

Thweatt, Archibald.....1900

Knoxville.

Rosenthal, David Abraham.....1894

Memphis.

Mayo, Frederick William.....1901
ROBINSON, JAMES SCOTT.....1869
Treherne, John Curtis.....1894

Nashville.

Burge, James Oscar.....1878
McGill, John Thomas 1900
Ruddiman, Edsel Alexander.....1894
Shwab, George Augustus.....1901
Steiner, Samuel Gideon.....1899

TEXAS.

Austin.

Neville, William Rust 1901

Dallas.

De Lorenzi, Albert 1890
Eberle, Eugene Gustavus 1896

Galveston.

Cline, Raoul Réné Danniel 1898
Orton, Ingomar Francois 1891

Hearne.

Hazlett, James Lupe 1900

Houston.

Burgheim, Jacob 1892

Pittsburg.

Greer, Samuel Rufus 1900

San Antonio.

Schmitt, George Joseph Francis 1890

Sherman.

Greiner, William Edward 1892
Sheehey, Henry Lee 1898

Taylor.

Thames, Joseph Jefferson 1895

Waelder, Gonzales Co.

Brookes, Virginia Cade 1901

UTAH.

Salt Lake City.

Hill, Frederick John 1895

VERMONT.

Brandon.

Hopkins, Zerah Blaisdell 1900

Brattleboro.

Root, Wilfred Franklin 1898

Montpelier.

Blakely, Collins 1899
Greene, Lester Henry 1899
Slade, Harry Allen 1899
Terrill, Willis Ethel 1899

Northfield.

Dunham, Andrew Allen 1901
Sanborn, George Cassius 1899

Rutland.

Higgins, Albert Warren 1895

St. Albans.

Dutcher, Alfred Luther 1892

St. Johnsbury.

Bingham, Charles Calvin 1875

VIRGINIA.

Forksville.

Walker, Emmett Edward 1900

Lynchburg.

Goldsborough, Charles Henry 1898

Newport News.

Klor, Alexander Edward George 1899

Norfolk.

MacRae, John Young 1894
May, Edward 1897
McLarty, Colin 1898
Price, Roger Taylor 1899

Richmond.

Baker, Thomas Roberts 1856
Barksdale, George Edwards 1900
Briggs, Andrew Gessner 1890
Chelf, Thomas Wilber 1900
Harrison, Richard Heth Munford 1895
Harrison, Robert Lucius 1900
Miller, Turner Ashby 1894
Reade, Frank Marshall 1900
Scott, William Henry 1873
Snook, William Howard 1900

Roanoke.

Massie, Paul 1899

South Boston.

Faulkner, Garland Estes 1898

Suffolk.

Hall, Joseph Patten 1900

WASHINGTON.

La Connor, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus. 1889

New Whatcom.

Nicholson, Edgar Lawrence 1900

Pullman.

Watt, George Henry. 1896

Seattle.

Holmes, Henry Elliott 1880
Osseward, Cornelius 1897

Snohomish.

Wilbur, Lot 1896

Tacoma.

Cummings, Henry Thornton 1853

WEST VIRGINIA.

Wheeling.

Williams, William Hudson 1880

WISCONSIN.

La Crosse.

Beyschlag, Charles 1880

Madison.

Fischer, Richard 1901
Kremers, Edward 1887
Schreiner, Oswald 1900

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius 1884

Milwaukee.

Dadd, Robert Morrow 1896
DRAKE, JOHN RANSOM 1860
Frank, Hermann Otto 1898
Kettler, Edward, Jr. 1896
Kienth, Hans 1884
Raeuber, Edward Gottfried 1900
Ruenzel, Henry Gottlieb 1892
Schrank, Charles Henry 1876

Neillsville.

Sniteman, Charles Clarence 1881

Watertown.

Eberle, Herman Theodore 1901

DOMINION OF CANADA.

MANITOBA.

Winnepeg.

Flexon, Charles 1897

NOVA SCOTIA.

Halifax.

Simson. Francis Cook 1876

ONTARIO.

Hamilton.

Clark, John Alexander 1890

Ottawa.

SAUNDERS, WILLIAM 1860
Watters, Henry 1896

Parkhill.

Roberts, James Frederick 1901

Picton.

Case, Edmund Wendall 1901

Stratford.

WAUGH, GEORGE JAMES 1862

Toronto.

Heebner, Charles Frederick. 1894

Windsor.

D'Avignon, John Eugene 1888

QUEBEC.

Montreal.

Baridon, Louis Richard 1890
Gray, Henry Robert 1867
Lachance, Seraphin 1888
Lanctot, Henri Raymond 1894
Morrison, Joseph Edward. 1888

Quebec.

Willis, Henry 1897

St. Hyacinthe.

St. Jacques, Gaston 1900

Three Rivers.

Williams, Richard Wellington. 1883

MEMBERS RESIDING IN FOREIGN COUNTRIES (*except Canada*).

Bowen, William Africanus, Mombasa, British East Africa 1897
Graham, Clarence Montrose, Manila, P. I. 1897
Heyl, James Bell, Hamilton, Bermuda 1863
Jacobs, Charles Christian, Ciego de Avila, Cuba. 1901
Jorgenson, Hans Christian, Gibrara, Cuba 1899
Long, John Pomfret, Manila, P. I. 1901

Martin, Nicholas Henry, Gateshead on Tyne, England.....1891
Power, Frederick Belding, London, England.....1872
Rumsey, Samuel Louis, Honolulu, Hawaiian Islands.....1876
Wellcome, Henry Solomon, London, England.....1875

MEMBERS WHOSE RESIDENCE IS UNKNOWN.

Baker, Maury Davison.....1897
Cardwell, James Robert.....1899
Forston, Keene Richards.....1899

Note.—Names of life members whose residence has been unknown for five consecutive years, are no longer published in the above list, in accordance with the action of the Council approved at the forty-eighth annual meeting. (See Proceedings 1900, p. 18.)

ALPHABETICAL LIST OF MEMBERS.

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Schacht, Dr. Karl, 56 Mittelstrasse, Berlin, N. W., Germany.
Schaer, Dr. Edward, Professor of Pharmacy, pharmaceutisches Institut der Universität, Strassburg, Germany.
Schmidt, Professor Dr. Ernst, Geh. Regierungsrath, Marburg, Germany.

ACTIVE MEMBERS.

Members are requested to notify the General Secretary of errors or inaccuracies in the following list. The Association will not replace volumes of Proceedings lost through changes of residence of which the General Secretary has not been notified. See Proceedings, 1866, p. 66.

Abbett, William A.,
201 W. Superior st., Duluth, Minn.
Abernethy, Maxwell,
188 Newark ave., Jersey City, N. J.
Adamick, Gustave H.,
189 E. Madison st., Chicago, Ill.
Aimar, Charles P.,
411 King st., Charleston, S. C.
Allen, E. Floyd,
1538 Nicollet ave., Minneapolis, Minn.
Alexander, Chas. E.,
961 N. George st., York, Pa.
Allison, William O.,
100 William st., New York, N. Y.
Alpers, William C.,
45 W. 31st st., New York, N. Y.
Alpers, William H.,
302 Ave. D., Bayonne, N. J.
Ameling, Frank H.,
2800 Shenandoah st., St. Louis, Mo.
Amend, Bernard G.,
205 3d ave., New York, N. Y.
Amend, Otto P.,
205 3d ave., New York, N. Y.
Anderson, Samuel,
48 Front st., Bath, Me.
Anderson, Wm. C.,
320 Lafayette ave., Brooklyn, N. Y.
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Appleby, Samuel N.,
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Appleton, William R.,
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Aquaro, Joseph,
202 Spring st., New York, N. Y.
Ardery, Lorimer,
106 N. Main st., Hutchinson, Kan.
Argenti, Jerome J. B.,
2944½ Mission st., San Francisco, Cal.
Arnett, William N.,
620 S. Alabama st., Indianapolis, Ind.
Arny, Harry V.,
782 Republic st., Cleveland, O.
Arrington, Homer H.,
Summerville, Ga.
Aughinbaugh, David C.,
54 W. Washington st., Hagerstown, Md.
Averill, William H.,
435 Main st., Frankfort, Ky.
Axness, Ole M.,
Pelican Rapids, Otter Tail Co., Minn.
Bailey, Frederick,
P. O. Box 314, Lowell, Mass.
Baird, Julian W.,
102 St. Botolph st., Boston, Mass.
Baker, Edwin,
Bridge st., Shelburne Falls, Mass.
Baker, Maury D.
Residence Unknown.
Baker, T. Roberts,
Cor. Lester & Ash sts., Richmond, Va.
Ball, Charles E.,
227 High st., Holyoke, Mass.
Ballagh, Wilfred T.,
S. E. cor. Square, Nevada, Mo.
Ballard, John W.,
106 W. 2d st., Davenport, Ia.
Balser, Gustavus,
137 Avenue B, New York, N. Y.
Bamford, Melvin W.,
1827 Pacific st., Tioga, Philad'a, Pa.
Barbat, Josephine E.,
1310 Folsom st., San Francisco, Cal.
Bard, William E.,
108 W. Main st., Sedalia, Mo.
Baridon, Louis R.,
1703 St. Catharine st., Montreal, Can.

Barksdale, George E.,
3900½ Williamsburg ave., Richmond, Va.
Barnett, Joel J.,
509 W. Lombard st., Baltimore, Md.
Bartells, George C.,
130 East State st., Camp Point, Ill.
Barth, Geo. F.,
State st., North Alton, Ill.
Barth, Henry H.,
929 O st., Lincoln, Nebr.
Bartlett, N. Gray,
22d st. & Indiana ave., Chicago, Ill.
Bartley, Elias H.,
21 Lafayette ave., Brooklyn N. Y.
Bartmer, Adolph H.,
3180 Easton ave., St. Louis, Mo.
Base, Daniel,
329 N. Schroeder st., Baltimore, Md.
Bassett, Charles H.,
109 Arch st., Boston, Mass.
Batt, Bruno,
948 Chouteau ave., St. Louis, Mo.
BAUER, LOUIS G.,
635 N. 5th st., Philadelphia, Pa.
Baughman, John H.,
612 N. Fremont ave., Baltimore, Md.
Baur, Jacob,
76 Illinois st., Chicago, Ill.
Baylis, Lewis F.,
388 Fulton st., Jamaica, Queens Co., N. Y.
Bayly, Charles A.,
Grant ave. & Sutter st., San Francisco, Cal.
Beal, James H.,
Scio, O.
Beck, John G.,
1538 N. Caroline st., Baltimore, Md.
Becker, Charles L.,
304 Main st., Ottawa, Kan.
Behrens, Emil C. L.,
802 S. Halstead st., Chicago, Ill.
Behrens, Paul J.,
727 W. Indiana st., Chicago, Ill.
Beitenman, William W.,
2d st. & Bennett ave., Cripple Creek, Colo.
Bell, Emil R.,
2500 W. Market st., Louisville, Ky.
Bell, S. Howard,
Lock Box 121, Derry Depot, N. H.
Benfield, Charles W.,
Willson & Payne aves.. Cleveland, O.
Bennett, James N.,
853 Main st., Hartford, Conn.
Benton, Wilber M.,
325 Main st., Peoria, Ill.
Beringer, George M.,
501 Federal st., Camden, N. J.
Berryhill, Henry P.,
Buttermore Block, Connellsville, Pa.
Berryman, William E.,
Union Station, St. Louis, Mo.
Best, John,
1 German Block, Central City, Colo.
Betzler, Jacob,
593 Orange st., Newark, N. J.
Beyschlag, Charles,
503 Main st., La Crosse, Wis.
Bigelow, Clarence O.,
102 Sixth ave., New York, N. Y.
Billings, Henry M.,
28 W. 50th st., New York, N. Y.
Bingham, Charles C.,
37 Main st., St. Johnsbury, Vt.
BIROTH, HENRY,
481 25th st., Chicago, Ill.
Bishop, Samuel E.,
37 Rush st., Chicago, Ill.
Blackmore, Henry S.,
206 S. 9th ave., Mt. Vernon, N. Y.
Blaikie, William,
202 Genesee st., Utica, N. Y.
Blake, James E.,
96 N. 2d st., New Bedford, Mass.
Blakeley, George C.,
175 2d st., The Dalles, Ore.
Blakely, Collins,
5 State st., Montpelier, Vt.
Blanding, Wm. O.,
54 Weybosset st., Providence, R. I.
Blank, Alois,
1353 S. 5th st., St. Louis. Mo.
Blumauer, Louis,
4th & Morrison sts., Portland, Ore.
Bobbitt, James H.,
233 Fayetteville st., Raleigh, N. C.
Boeddiker, Otto,
954 6th ave., New York, N. Y.
Boehm, Solomon,
800 Morgan st., St. Louis, Mo.
Boerner, Emil L.,
113 Washington st., Iowa City, Ia.
Bohmansson, Robert H.,
Arcata, Humboldt Co., Cal.
Bohn, Carl H.,
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Bond, John B.,
Main & 5th sts., Little Rock, Ark.
Borell, Henry A.,
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929 Fairmount ave., Philadelphia, Pa.
Bowen, Cyrus W.,
Plattsburg, Mo.
Bowen, William A.,
Mombasa, British East Africa.
Boyd, Charles N.,
Main st., Butler, Pa.
Boyd, George W.,
C st., N. E., near 2d, Washington, D. C.
Boyden, Edward C.,
Joy & Myrtle sts., Boston, Mass.
Boynton, Herschell,
74 Main st., Biddeford, Me.
Brack, Charles E.,
Ensor & Forrest sts., Baltimore, Md.
Bradbury, Wymond H.,
808 I st., N. W., Washington, D. C.
Bradley, Theodore J.,
Albany Coll. Pharm., Albany, N. Y.
Brandenberger, Adolph,
130 E. High st., Jefferson City, Mo.
Brecht, Frederick A.,
209 3d st., W., Yankton, S. Dak.
Breunert, August,
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Brickman, Arthur O.,
500 E. Baltimore st., Baltimore, Md.
Briggs, Andrew G.
204 Howitzer Place, Richmond, Va.
Brigham, Lawrence S.,
25 Dexter ave., Montgomery, Ala.
Brisley, Harry,
Prescott, Ariz.
Broe, James A.,
478 Congress st., Portland, Me.
Brookes, Virginia C.,
Waelder, Gonzales co., Tex.
Brooks, George W.,
1161 Myrtle ave., Brooklyn, N. Y.
Brown, Albert E.,
14 N. Water st., Mobile, Ala.
Brown, George S.,
2801 St. Charles ave., New Orleans, La.
Brown, William A.,
Eagle Drug Store, Winnemucca, Neb.
Brown, William T.,
Box 19, Madison, N. J.
Bruce, James,
544 Prospect st., Cleveland, O.
Bruck, Philip H.,
961 S. High st., Columbus, O.
Brundage, Albert H.,
1153 Gates ave., Brooklyn, N. Y.
Brunner, Norman L.,
4th & Arch sts., Macon, Ga.
Buchheit, Aug. W.,
119 W. 3d st., Grand Island, Neb.
Buck, John L.,
25 County Road, Chelsea, Mass.
Bulger, Alvin H.,
6th & W. Market sts., East Liverpool, O.
Bunker, Elihu,
40 St. James st., Kingston, N. Y.
Burg, John D.,
4th & Brown sts., Philadelphia, Pa.
Burge, James O.,
Church & High sts., Nashville, Tenn.
Burgheim, Jacob,
1019 Congress ave., Houston, Tex.
Burkhardt, Mark A.,
Third & St. Clair sts., Dayton, O.
Burnham, Alfred A., Jr.,
459 Dudley st., Boston, Mass.
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182 W. 1st st., Oswego, N. Y.
Butler, Freeman H.,
391 Middlesex st., Lowell, Mass.
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744 W. Van Buren st., Chicago, Ill.
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28 King st., Pottstown, Pa.
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200 N. High st., Columbus, O.
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Colen, James A.,
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Collier, William K.,
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Collins, Albert B.,
48 Main st., Westerly, R. I.
Colton, James E.,
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252 Pike st., Cincinnati, O.
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55 Beacon st., Hartford, Conn.
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145 N. 10th st., Philadelphia, Pa.
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Davis, Eugene M.,
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De Lorenzi, Albert,
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Dohme, C. Louis,
Pratt & Howard sts., Baltimore, Md.
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Dunn, John A.,
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Finlay, Alexander K.,
124 Baronne st., New Orleans, La.
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Frames, J. Fuller,
601 N. Gay st., Baltimore, Md.
Frank, Hermann O.,
49 Biddle st.. Milwaukee, Wis.
Franzoni, Joseph D.,
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Fraser, Horatio N.,
262 5th ave., New York, N. Y.
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1637 N. 9th st., St. Louis, Mo.
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122 1st st., Elizabeth, N. J.
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320 Congress st., Portland, Me.
FULLER, OLIVER F.,
220 Randolph st., Chicago, Ill.
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3134 S. 7th st., St. Louis, Mo.
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Gale, Edwin O.,
85 S. Clark st., Chicago, Ill.
Gale, Walter H.,
34 Washington st., Chicago, Ill.
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82 S. Clark st., Chicago, Ill.
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Gamble, Stewart,
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47 S. High st., Columbus, O.
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1033 22d st. N. W., Washington, D. C.
Hydren, Carl,
223 North st., Pittsfield, Mass.
Hynson, Henry P.,
423 N. Charles st., Baltimore, Md.
Ilhardt, William K.,
4836 Delmar Boulevard, St. Louis, Mo.
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Columbiana, O.
Ires, Orvin F.,
853 Main st., Hartford, Conn.
Jackman, Wilbur F.,
Orono, Me.
Jackson, Frank A.,
90 Main st., Woonsocket, R. I.
Jackson, William J.,
44 Third st., San Francisco, Cal.
Jacobs, Charles C.,
Ciego de Avila, Cuba.
JACQUES, GEORGE W.,
Broadway & Augusta st., S. Amboy, N. J.
James, Frank L.,
St. Louis, Mo.
Jelliffe, Smith E.,
231 W. 71st st., New York, N. Y.
Jenks, William A.,
4043 Market st., Philadelphia, Pa.
Jesson, Jacob,
Euclid ave., Ontario, Cal.
Joergensen, Sophus,
Commercial st., La Conner, Skagit co., Wash.
Johnson, Chas. B.,
54 Third st., Middletown, O.
Johnson, D. Dudley,
Concord, N. C.
Johnson, Joseph H.,
Arcanum, O.
Johnson, Louise L. (Mrs.),
Wall st., Jasper, Minn.
Johnson, Ralph H.,
1336 Juniata st., Allegheny, Pa.
Jones, Alexander H.,
9th & Parrish sts., Philadelphia, Pa.
Jones, David F.,
Watertown, S. Dak.
Jones, James T.,
855 E. 4th st., South Boston, Mass.
Jones, Simon N.,
1st & Jefferson sts., Louisville, Ky.
Jorgenson, Hans C.,
U. S. S. Yankton, Gibara, Cuba.
Joy, Edwin W.,
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Judd, Albert F.,
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Kalish, Julius,
413 Grand st., New York, N. Y.
Kalish, Oscar G.,
23d st. & 4th ave, New York, N. Y.
Kaltwasser, August P.
1918 Pestalozzi st., St. Louis, Mo.
Kauffman, George B.,
235 N. High st., Columbus, O.
Keaney, James J.,
Charles & West sts., Malden, Mass.
Kebler, Lyman F.,
35 Poplar st., Philadelphia, Pa.
Keefer, Charles D.,
320 N. Main st., Chambersburg, Pa.
Keenan, Thomas J.,
66 W. Broadway, New York, N. Y.
Keeney, Caleb R.,
16th & Arch sts., Philadelphia, Pa.
Kennedy, Ezra J.,
396 Broadway, New York, N. Y.
Kennedy, George W.,
103 N. Centre st., Pottsville, Pa.
Kent, Henry A., Jr.,
E. Broad st. & Jefferson ave., Elizabeth, N. J.
Kent, Robert R.,
220 W. 70th st., New York, N. Y.
Keppler, Christian L.,
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Kerns, William B.,
Bunceton, Cooper Co., Mo.
Kerr, William W.
Fullerton, Cal.
Kettler, Edward, Jr.,
Farwell ave. & Brady st., Milwaukee, Wis.

Kienth, Hans,
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Kilmer, Frederick B.,
147 College ave., New Brunswick, N. J.
Kimball, Richard H.,
206 Park st., Hartford, Conn.
King, Campbell T.,
Cotton ave. & Mulberry st., Macon, Ga.
King, Ferdinand H.,
205 N. Main st., Delphos, O.
King, George A. N.,
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KING, JAMES T.,
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King, Robert B.,
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Kinney, Charles N.,
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Kirkland, Derwentwater,
320 S. Spring st., Los Angeles, Cal.
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Klein, Frederick,
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Bluff & Pride sts., Pittsburgh, Pa.
Koch, Louis,
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La Wall, Charles H.,
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Lyon, George C.,
225 Westminster st., Providence, R. I.
Lyons, Albert B.,
72 Brainard st., Detroit, Mich.
Lyons, Fred. W.,
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Martin, Nicholas H.,
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May, Edward,
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May, James O.,
Water st., Naugatuck, Conn.
Mayo, Caswell A.,
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Mayo, Frederick W.,
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Boothbay Harbor, Me.
McConnell, Chas. H.,
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McDonald, George,
Main & Burdick sts., Kalamazoo, Mich.
McElhenie, Thomas D.,
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Meissner, F. W., Jr.,
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Meller, Alfred,
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Menk, Charles W.,
106 Market st., Newark, N. J.
Mente, Alvin W.,
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Meredith, H. Lionel,
319 Washington st., Hagerstown, Md.
Merrell, Charles G.,
5th & Butler sts., Cincinnati, O.
Merrell, George,
5th & Butler sts., Cincinnati, O.
Merrell, George R.,
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Merrem, Charles D.,
1050 N. Taylor ave., St. Louis, Mo.
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MEYER, CHRISTIAN F. G.,
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Meyer, Martin M.,
118 N. Main st., South Bend, Ind.
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Miller, Chas. E.,
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Miller, Emerson R.,
Polytechnic Inst., Auburn, Ala.
Miller, Herman,
U. S. A., Benicia Barracks, Cal.
Miller, Jacob A.,
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Miller, T. Ashby,
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Miller, Wm. H.,
New Philadelphia, O.
Milligan, Decatur,
509 N. 2d st., Philadelphia, Pa.
Milligan, John D.,
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Miner, Maurice A.,
2421 Dearborn st., Chicago, Ill.
Minner, Louis A.,
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Mittelbach, William,
114 Main st., Boonville, Mo.
Mix, Willis L.,
871 Chapel st., New Haven, Conn.
Moerk, Frank X.,
2510 Brown st., Philadelphia, Pa.
Moffit, Thomas S.,
1617 Sacramento st., San Francisco, Cal.
Moith, Augustus T.,
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Molwitz, Ernest,
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MOORE, GEORGE,
26 Market st., Somersworth, N. H.
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13th & Lombard sts., Philadelphia, Pa.
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Mueller, Adolphus,
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Mueller, Ambrose,
Bristol Bldg., Webster Groves, Mo.
Muench, Wm.,
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Mulford, Henry K.,
412 S. 13th st., Philadelphia, Pa.
Mumma, Edgar.
220 S. Jonathan st., Hagerstown, Md.
Murphy, John P.,
Main st., North Andover, Mass.
Murphy, John S.,
Union Block, Pontiac, Ill.
Murray, Benjamin L.,
Care Merck & Co., New York, N. Y.
Muth, George L.,
15 E. Fayette st., Baltimore, Md.
Muth, John C.,
15 E. Fayette st., Baltimore, Md.
Muth, John S.,
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Myers, Daniel,
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Myers, Preston B.,
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1347 Clay st., Dubuque, Ia.
Nattans, Arthur,
Cor. Lexington & Howard sts., Balto., Md.
Naylor, William W.,
Holton, Jackson Co., Kan.
Neal, Chas. C.,
Care of Sharp & Dohme, Baltimore, Md.
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254 11th st. S. E., Washington, D. C.
Neville, William R.,
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Newman, George A.,
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Newton, Philo W.,
142 Asylum st., Hartford, Conn.
Nichols, John C.,
119 State st., New London, Conn.
Nichols, Thomas B.,
180 Essex st., Salem, Mass.
Nicholson, Edgar L.,
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2d & Madison sts., Memphis, Tenn.
Rockefeller, Howard,
653 W. Granite st., Butte, Mont.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rodemoyer, William E.,
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Roe, William G.,
1034 7th st. N. W., Washington, D. C.
Roesch, Anton,
1311 Michigan ave., Chicago, Ill.
Rogers, Arthur H.,
Geneseo, Livingston Co., N. Y.
Rogers, Henry H.,
224 Court st., Kankakee, Ill.
Rogers, William H.,
North st., Middletown, N. Y.
Rollins, John F.,
7 Hamilton st., Dover, N. H.
Root, Wilfred F.,
67 Main st., Brattleboro, Vt.
Rose, Herman L.,
Columbia, Ill.
Rosenthal, David A.,
Gay & Depot sts., Knoxville, Tenn.
Rosenzweig, Benj.,
624 Fulton st., Brooklyn, N. Y.
Roth, Charles R.,
333 E. Tuscarawas st., Canton, O.
Rowlinski, Robert A.,
104 Broughton st., Savannah, Ga.
Ruddiman, Edsel A.,
Vanderbilt Univ., Nashville, Tenn.
Ruenzel, Henry G.,
753 3d st., Milwaukee, Wis.
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Fort & Hotel sts., Honolulu, H. I.
Runyon, Edward W.,
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Ruppert, John,
Price Hill, Cincinnati, O.
Rusby, Henry H.,
115 W. 68th st., New York, N. Y.
Ryan, Frank G.,
151 Joseph Campau ave., Detroit, Mich.
Sadtler, Samuel P.,
N. E. corner 10th & Chestnut sts., Phila., Pa.
Samson, Max,
111 Camp st., New Orleans, La.
Sanborn, George C.,
Northfield, Vt.
SANDER, ENNO,
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Main st., Mayville, Dodge Co., Wis.
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52 Main st., Saco, Me.
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Schlotterbeck, Julius O.,
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Schmidt, Ferdinand T.,
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Schmidt, Oscar W.,
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Schmidt, Valentine,
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Schmitt, George J. F.,
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Maple st., Gypsum City, Saline Co., Kan.
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Schoenthaler, John P.,
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Elliot & Curley sts., Baltimore, Md.
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8th & Humboldt sts., Tell City, Ind.
Schreiner, Oswald,
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Schuh, Paul G.,
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Schurk, Louis,
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Scott, Theodore W.,
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Green Lane & York Road, Philadelphia, Pa.
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Sharp, Alpheus P.,
Pratt & Howard sts., Baltimore, Md.
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1513 Dodge st., Omaha, Neb.
Sherrard, Charles C.,
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Sherwood, Henry J.,
979 Woodland ave., Cleveland, O.
SHINN, JAMES T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
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Sonoma, Cal.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
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Nashville, Tenn.
Siegenthaler, Harvey N.,
22 E. High st., Springfield, O.
Sieker, Ferdinand A.,
120 William st., New York, N. Y.
Silverburg, Victor E,
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1348 Block st., Baltimore, Md.
Simonson, William,
126 W. 9th st., Cincinnati, O.
Simpson, William,
101 Fayetteville st., Raleigh, N. C.
Simson, Francis C.,
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Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
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Smith, Edward S.,
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King st., St. Augustine, Fla.
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Smith, Reuben R.,
198 9th ave., New York, N. Y.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Whitefoord G.,
31 Patton ave., Asheville, N. C.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smithson, David E.,
Emmett, Canyon Co., Idaho.
Sniteman, Charles C.,
Neillsville, Clark Co., Wis.
Snodgrass, Latta K.,
120 Main st., Little Rock, Ark.
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1017 W. Main st., Richmond, Va.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
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Care of Geo. H. Sombart, Wilmore, Kan.
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Spalding, Warren A.,
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Sperry, Herman J.,
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Squibb, Edward H.,
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St. Hyacinthe, Que., Can.
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Taylor, George E.,
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Taylor, Mallory H.,
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Temm, William D.,
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Terrill, Willis E.,
9 State st., Montpelier, Vt.
Thames, Joseph J.,
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Thomas, John B.,
Baltimore & Light sts., Baltimore, Md.
Thomas, Oscar E.,
164 Main st., Columbia, S. C.
Thomas, Robert, Jr.,
108 Broad st., Thomasville, Ga.
Thomasson, Anders,
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Thompson, Albert D.,
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Thompson, William B.,
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Main st, Medford, N. J.
Thurston, Azor,
Grand Rapids, Wood Co., O.
Thweatt, Archibald,
Main st., Humboldt, Tenn.
Tigner, James O.,
Greenville, Meriwether Co., Ga.
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Todd, Albert M.,
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Tontz, George W.,
2248 Dodier st., St. Louis, Mo.
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316 Georgia st., Vallejo, Solano Co., Cal.
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19 Vine st., Brooklyn, N. Y.
Torbert, Willard H.,
756 Main st., Dubuque, Ia.
Tracy, David W.,
139 Main st., Hartford, Conn.
Treat, Joseph A.,
Stuart, Guthrie Co., Ia.
Trefethen, Frederick J.,
Naval Dispensary, Kittery, Me.
Treherne, John C.,
189 Hernando st., Memphis, Tenn.
Troxler, Constantine, Jr.,
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Truax, Charles,
42 Wabash ave., Chicago, Ill.
Tsheppe, Adolph,
64th st. & Park ave., New York, N. Y.
Tucker, Greenleaf R.,
City Hospital, Boston, Mass.
Turner, George H.,
296 S. Pearl st., Albany, N. Y.
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60 Ontario st., Cleveland, O.
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35 Clinton ave., Newark, N. J.
Vargas, Jorge,
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Varney, Edward F.,
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Vaughan, Parry W.,
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Walker, E. Edward,
Forksville, Mecklenburg Co., Va.
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803 Market st., Wilmington, Del.
Watson, Sidney P.,
137 Richardson st., Atlanta, Ga.
Watt, George H.,
Pullman, Wash.
Watters, Henry,
Sparks & Bank sts., Ottawa, Can.
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556 N. 16th st., Philadelphia, Pa.
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320 S. 7th st., St. Louis, Mo.
Weidemann, Charles A.,
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WELLCOME, HENRY S.,
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Weller, Frank P.,
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Wendt, William C.,
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Wenzell, William T.,
436 Oak st., San Francisco, Cal.
Werner, Rudolf C.,
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Wetterstroem, Theodore D.,
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Whitehead, Eugene T.,
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Warren, Minn.
WHITNEY, HENRY M.,
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Wichelns, Frederick,
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Wickham, William H.,
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Williams, Seward W.,
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Williams, William H.,
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Williamson, Lee,
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Willis, Henry,
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WINKELMANN, JOHN H.,
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WINTER, JONAS,
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Wisdom, Hugh,
426 State st., Chicago, Ill.
Wittich, Matthew H.,
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Wittmer, Joseph W., Jr.,
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Wood, James P.,
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Woodworth, Charles B.,
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Wooten, Thomas V.,
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Beardmore, Wm. A.,	Jersey City, N. J.,	Elected	1890
Bingham, Wm. E.,	Tuscaloosa, Ala.,	"	1898
Boyce, Samuel F.,	Duluth, Minn.,	"	1871
Case, Charles H.,	Jefferson, O.,	"	1892
Charropin, Emile,	Port Allen, La.,	"	1891
Christianson, Lars,	Fargo, N. Dak.,	"	1896
Church, Merton W.,	Falls Church, Va.,	"	1892
Cole, Howson W.,	Danville, Va.,	"	1882
Coupe, Robert E.,	St. Johns, New Brunsw.,	"	1894
Douglass, Stephen W.,	Boston, Mass.,	"	1898
Eagny, James T.,	New Haven, Conn.,	"	1894
Eschman, F. W. R.,	Yonkers, N. Y.,	"	1880
Freid, Isadore,	New York City, N. Y.,	"	1897
Hall, Horace B.,	Fredericksburg, Va.,	"	1896
Haussamen, Henry L.,	Grafton, N. Dak.,	"	1888
Huntington, Wm. H.,	Newport, R. I.,	"	1891
Jacobs, Joseph,	Atlanta, Ga.,	"	1894
Kiedaisch, Jno. F., Jr.,	Keokuk, Ia.,	"	1893
Lehman, Louis,	Chicago, Ill.,	"	1895
Lernhart, August,	Centreville, Cal.,	"	1889
Lord, Frank J.,	Denver, Colo.,	"	1889
Manning, John H.,	Pittsfield, Mass.,	"	1889
Mead, Nehemiah P.,	Akron, Ia.,	"	1899
Morgan, Charles,	Baltimore, Md.,	"	1899
Mulcahy, Daniel D.,	Washington, D. C.,	"	1895
Parisen, Allen C.,	South Amboy, N. J.,	"	1895
Phillips, Chas. W.,	Cincinnati, O.,	"	1881
Phillips, Edwin F.,	Armada, Mich.,	"	1880
Plenge, Henry,	Charleston, S. C.,	"	1894
Porter, Millet N.,	Chicago, Ill.,	"	1892
Prieson, Adolph,	Lock Haven, Pa.,	"	1880
Reynolds, Howard P.,	Plainfield, N. J.,	"	1875
Schweickhardt, Rich'd.,	St. Louis, Mo.,	"	1890
Shaw, Robert J.,	Plainfield, N. J.,	"	1897
Sherwin, Eugene A.,	Ashland, Ore.,	"	1889
Slack, Henry R.,	La Grange, Ga.,	"	1890
Snyder, Robert J.,	Louisville, Ky.,	"	1887
Staebler, Richard,	Newark, N. J.,	"	1892
Stedem, Fred. W. E.,	Philadelphia, Pa.,	"	1892
Steele, George R.,	Thompsonville, Conn.,	"	1892
Steinhauer, Frederick,	Denver, Colo.,	"	1881
Wright, Frank C.,	Cave Springs, Ga.,	"	1900
Yarnold, Edwin,	Washington, D. C.,	"	1900
Zellhoefer, George,	Brooklyn, N. Y.,	"	1876

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Arnold, Charles F.,	Sioux City, Ia.,	Elected 1891
Burgess, Wm. G.,	Newport News, Va.,	" 1898
Conrath, Adam,	Milwaukee, Wis.,	" 1881
COOMBS, CHAS. C.,	Boston, Mass.,	" 1897
Du Puy, Eugene,	Detroit, Mich.,	" 1852
Gosman, Adam J.,	Baltimore, Md.,	" 1870
Hammel, Joseph,	Medford, Wis.,	" 1887
Heinemann, Otto,	Cincinnati, O.,	" 1864
Howey, John J.,	Montreal, Can.,	" 1896
Kemp, Edward,	New York, N. Y.,	" 1888
Laing, Alfred A.,	Cambridgeport, Mass.,	" 1888
Louis, Leopold G.,	New York, N. Y.,	" 1897
Maisch, Henry C. C.,	Philadelphia, Pa.,	" 1900
May, Eugene,	New Orleans, La.,	" 1891
Mennen, Gerhard,	Newark, N. J.,	" 1888
Oberdeener, Samuel,	Santa Clara, Cal.,	" 1889
Osmun, Charles A.,	New York, N. Y.,	" 1868
PFINGST, FERDINAND J.,	Louisville, Ky.,	" 1867
Preston, David,	Philadelphia, Pa.,	" 1868
Quayle, Thomas A.,	New Orleans, La.,	" 1897
Rice, Charles,	New York, N. Y.,	" 1870
Sauer, Louis W.,	Cincinnati, O.,	" 1882
Scherff, John P.,	Bloomfield, N. J.,	" 1877
Thompson, William S.,	Washington, D. C.,	" 1871
Vonachen, Frank H.,	Peoria, Ill.,	" 1898
Warner, William R.,	Philadelphia, Pa.,	" 1857
Wilhite, Frank T.,	Anderson, S. C.,	" 1893
Wilson, Frank M.,	Willimantic, Conn.,	" 1883

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-PAYMENT OF DUES, ACCORDING TO ARTICLE III., CHAPTER VII., OF THE BY-LAWS.

(PUBLISHED IN ACCORDANCE WITH A GENERAL RULE, ADOPTED AT MONTREAL, CANADA, AUGUST, 1896. SEE PAGE 17, VOLUME 44, PROCEEDINGS.)

Allen, John H.,	St. Louis, Missouri,	Elected 1898
Banner, John,	Mt. Airy, N. C.,	" 1898
Baril, Joseph B.,	Manchester, N. H.,	" 1892
Belt, James F.,	Covington, Ky.,	" 1892
Birdsong, Edwin G.,	Raleigh, N. C.,	" 1898
Bradley, Frank H.,	Albany, N. Y.,	" 1896
Brewer, John W.,	Hammond, La.,	" 1893
Brunner, Charles H.,	Fremont, Neb.,	" 1895
Craighead, Gordon G.,	Aux Vasse, Mo.,	" 1895
Cronheim, Solomon,	Atlanta, Ga.,	" 1892

Danforth, Edmund C.,	Providence, R. I.,	Elected 1878
De Reeves, A. Eugene,	Cambridge, Md.,	" 1898
Dill, J. Byron,	Indianapolis, Ind.,	" 1878
Dolan, Frank L.,	Freeman, Mo.,	" 1888
Eppley, James K.,	Washington, D. C.,	" 1895
Fenner, Alexander W., Jr.,	Providence, R. I.,	" 1888
Foster, Charles E.,	Cleveland, Ohio,	" 1898
Frerksen, Richard C.,	Chicago, Illinois,	" 1888
Getty, Wilmot S.,	St. Paul, Minn.,	" 1896
Graham, Frank R.,	Mercer, Pa.,	" 1897
Grandjean, Eugene,	St. Louis, Mo.,	" 1871
Hall, Robert E. L.,	Baltimore, Md.,	" 1898
Hancock, Franklin W.,	Oxford, N. C.,	" 1888
Hartnett, Eugene,	Jersey City, N. J.,	" 1893
Hays, Joseph A.,	Pittsburg, Pa.,	" 1892
Hedley, Thomas A.,	Boston, Mass.,	" 1893
Higby, William H.,	Ottawa, Illinois,	" 1892
Huhn, Charles H.,	Minneapolis, Minn.,	" 1897
Jenkins, W. Edgar,	Baltimore, Md.,	" 1898
Joerger, Frederick,	Brunswick, Ga.,	" 1896
Johnston, Henry A.,	Washington, D. C.,	" 1883
Kaenter, Frederick W.,	St. Louis, Mo.,	" 1897
Kammer, D. Alexander,	Baltimore, Md.,	" 1898
Karn, William A.,	Woodstock, Ont., Can.,	" 1898
Kelley, Edward S.,	Boston, Mass.,	" 1871
Kelly, John I.,	Baltimore, Md.,	" 1898
Koch, John A.,	Quincy, Illinois,	" 1896
Krick, Charles A.,	Washington, D. C.,	" 1898
Kuhn, Norman A.,	Omaha, Neb.,	" 1878
La Grange, John V. N.,	Mobile, Ala.,	" 1897
Lariviere, Telesphore,	Minneapolis, Minn.,	" 1896
Libby, Henry F.,	Pittsfield, Maine,	" 1882
Lindeman, Harry F.,	Baltimore, Md.,	" 1898
Lohmann, Herman J.,	Jersey City, N. J.,	" 1896
Lynch, Robert F.,	Monticello, Minn.,	" 1897
Maphis, Charles G.,	Charlottesville, Va.,	" 1898
Massey, William M.,	New York, N. Y.,	" 1885
Menl, Henry W.,	Leavenworth, Kan.,	" 1892
Merrel, Ashbel H.,	Topeka, Kan.,	" 1884
Moulton, Daniel P.,	Lewiston, Me.,	" 1891
Otis, Clark Z.,	Binghamton, N. Y.,	" 1886
Pennock, Edward,	Baltimore, Md.,	" 1898
Peters, John M.,	New York, N. Y.,	" 1896
Peterson, J. Otto,	Minneapolis, Minn.,	" 1895
Pfeiffer, John,	San Antonio, Texas,	" 1898
Pickett, John H.,	Oskaloosa, Iowa,	" 1887
Pleasants, Charles H.,	New York, N. Y.,	" 1890
Robinson, Samuel L.,	Baltimore, Md.,	" 1898
Robinson, William A.,	Auburn, Me.,	" 1892
Rohde, Claus F.,	Spring Valley, Minn.,	" 1885
Schley, Steiner,	Frederick City, Md.,	" 1878
Sevin, N. Douglas,	Norwich, Conn.,	" 1875

Smink, Robert W.,	Shamokin, Pa.,	Elected 1893
Sprowl, George M.,	Union City, Ind.,	" 1898
Stoebr, Julius J.,	Garrett, Ind.,	" 1894
Stuver, Emanuel,	Rawlins, Wyo.,	" 1895
Thieman, John H., Jr.,	Louisville, Ky.,	" 1896
Vellines, Davies,	Baltimore, Md.,	" 1898
Walerius, Mathias,	St. Louis, Mo.,	" 1897
Walker, David,	Kansas City, Mo.,	" 1894
Walts, David Y.,	Portsmouth, N. H.,	" 1897
Webster, H. Gordon,	Minneapolis, Minn.,	" 1895
Weida, Charles A.,	Reading, Pa.,	" 1896
Weihe, Otto A.,	San Francisco, Cal.,	" 1893
Westmann, Frank H.,	St. Louis, Mo.,	" 1882
Wilson, Charles F.,	St. Louis, Mo.,	" 1891
Wilson, John M.,	Groveton, N. H.,	" 1897
Yearby, William M.,	Durham, N. C.,	" 1894
Youngs, William,	Rich Hill, Mo.,	" 1883

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